

**ENFIELD INLAND WETLAND & WATERCOURSES AGENCY**

**TUESDAY, APRIL 20, 2010**

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**\*\*\*REGULAR MEETING @ 7:00 PM\*\*\***

**\*\*\*PUBLIC HEARING to follow (if applicable)\*\*\***

**\*\*\*Council Chambers\*\*\***

**ENFIELD TOWN HALL  
820 ENFIELD STREET  
ENFIELD, CT**

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**INFORMATION PACKET**

**AGENDA**  
MEETING OF THE  
ENFIELD INLAND WETLANDS AND WATERCOURSES AGENCY  
TUESDAY, APRIL 20, 2010 – **7:00 pm**  
REGULAR MEETING

\*\*\*\*\***Council Chambers**\*\*\*\*\*

\*\*\*\*\* ENFIELD TOWN HALL \*\*\*\*\*

\*\*\* 820 ENFIELD STREET\*\*\*

\*\* ENFIELD, CT 06082 \*\*

**REGULAR MEETING**

1. Call to Order
2. Roll Call
3. Pledge of Allegiance
4. Executive Session  
(Matters regarding specific employees, pending litigation, acquisition of real estate and / or matters exempt from disclosure requirements)
5. Public Hearing
  - a. **XIW-10-04 – Town of Enfield Public Works** – is requesting a permit to reconstruct and enlarge the South Maple Street Bridge over the Scantic River (Map 84, Lots 7, 12, 14 and 21). Submitted 3/3/10, received 3/16/10, PPE 3/30/10, **MAD 5/20/10.**
6. Call to Order of Regular Meeting
7. Public Participation - Issues of concern not on the agenda
8. Correspondence
  - a. "Conserving pool-breeding amphibians in human-dominated landscapes through local implementation of Best Development Practices" paper
  - b. Giant Hogweed Handout
  - c. Norway Maple Handout
  - d. Plants Recommended for Wildlife
  - e. Agresource Handouts – Two Examples of Rain Gardens in New England
9. Commissioner's Correspondence
  - a. Site Visit Updates
10. Approval of Minutes – April 6, 2010
11. Wetlands Agent Report
12. Old Business
13. New Business
14. New Applications to be Received
  - a. Applications to be received after Town deadline for Agenda

15. Other Business

- a. IWWA Fines Ordinance
- b. IWWA Fee Schedule
- c. IWWA Regulation Revisions
- d. **Next regular meeting is Tuesday, May 4, 2010 at 7:00PM in the Council Chambers.**

16. Adjourn

Acronym Key for Dates:

Submitted	= Day it was Logged in by the Appropriate Town Office.
Rec'd	= Received (Date of First Regular Meeting after the day of submission or 35 days, which ever is sooner)
PPE	= Petition Period Ends (14 Days from Receipt)
MAD	= Mandatory Action Date (65 Days from Receipt)
EMAD	= Extended Mandatory Action Date (Any combination up to 65 days from original MAD)
MPHCD	= Mandatory Public Hearing Closing Date (35 Days from opening of the public hearing)
EMPHCD	= Extended Mandatory Public Hearing Closing Date (Any combination up to 65 Days from first MPHCD)
MPHAD	= Mandatory Public Hearing Action Date (35 Days after close of the public hearing)
EMPHAD	= Extended Mandatory Public Hearing Action Date (Any combination up to 65 Days from first MPHAD)

\*Applicant can consent to extend the time frame for any of the steps but the total of all extensions together cannot exceed 65 days

**PUBLIC HEARING**

**XIW-10-04 Town of Enfield Public Works**

**Bednaz, Katie**

*XIW-10-04*

**From:** Scala, Jeff [JScala@tectonicengineering.com]  
**Sent:** Tuesday, April 13, 2010 4:07 PM  
**To:** Bednaz, Katie  
**Cc:** \_PublicWorksDirector  
**Subject:** RE: South Maple Street - Construction Sequence and Permits  
**Attachments:** B-9-NTC - Staging Areas and Worksite Cleanliness.doc; B-4-NTC - Construction Sequence.doc

Katie,

Attached are the updated specs as discussed. the only thing not included is the concrete wash but will add once we receive it.  
 Jeffrey A. Scala, P.E.

60.563.2341 voice

60.707.9717 cell

60.257.4882 fax

[scala@tectonicengineering.com](mailto:scala@tectonicengineering.com)

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**From:** Bednaz, Katie [mailto:kbednaz@enfield.org]  
**Sent:** Tuesday, April 13, 2010 3:23 PM  
**To:** Scala, Jeff  
**Cc:** Hawkes, Piya; Haouchine, Houcine  
**Subject:** RE: South Maple Street - Construction Sequence and Permits

If possible, it would be best to have this information before the end of the day tomorrow so that it can go to the agency.

Thanks,

*Katie Bednaz*

*Certified PWS & Registered Soil Scientist*

Assistant Planner / Wetlands Agent

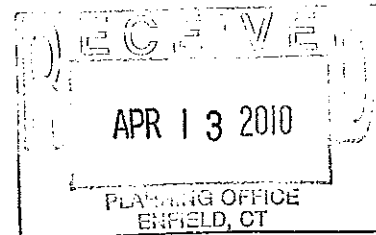
Enfield Town Hall

120 Enfield Street

Enfield, CT 06082

Phone: (860) 253-6358

Fax: (860) 253-4729



**From:** Scala, Jeff [mailto:JScala@tectonicengineering.com]  
**Sent:** Tuesday, April 13, 2010 3:16 PM  
**To:** Bednaz, Katie  
**Cc:** Hawkes, Piya; Haouchine, Houcine  
**Subject:** RE: South Maple Street - Construction Sequence and Permits

4/13/2010

Katie,

As a follow up to our conversation:

- There is only one outlet proposed. The existing outlet southwest of the bridge will remain unchanged.
- We will try to define "Spill Kit"
- Will modify the plans to extend the armoring out to the edge of the watercourse.
- Will contact Engineering to determine how the property owners will be contacted to meet the notice requirement.

Jeffrey A. Scala, P.E.

360.563.2341 voice

360.707.9717 cell

360.257.4882 fax

[scala@tectonicengineering.com](mailto:scala@tectonicengineering.com)

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---

**From:** Bednaz, Katie [<mailto:kbednaz@enfield.org>]  
**Sent:** Monday, April 12, 2010 3:53 PM  
**To:** Scala, Jeff; Hawkes, Piya  
**Cc:** Estanislau, Anthony; Haouchine, Houcine  
**Subject:** RE: South Maple Street - Construction Sequence and Permits

Looked at these and have the following comments.

- Item #6. It sounds like one outlet would be constructed. Wouldn't they construct all outlets at this time?

*Katie Bednaz*

*Certified PWS & Registered Soil Scientist*

Assistant Planner / Wetlands Agent

Enfield Town Hall

820 Enfield Street

Enfield, CT 06082

Phone: (860) 253-6358

Fax: (860) 253-4729

---

**From:** Scala, Jeff [<mailto:JScala@tectonicengineering.com>]  
**Sent:** Friday, April 09, 2010 3:17 PM  
**To:** Bednaz, Katie; Hawkes, Piya  
**Cc:** Estanislau, Anthony; Haouchine, Houcine  
**Subject:** South Maple Street - Construction Sequence and Permits

Katie,

Please see attached spec for the construction sequencing and permits

Jeff Scala  
Vice President - Regional Director

4/13/2010

# TECTONIC

Practical Solutions, Exceptional Service

**Planning - Engineering - Construction and Program Management**

344 Silas Deane Highway, Suite 500 Rocky Hill, CT 06067

860.563.2341 voice 860.257.4882 fax

[www.tectonicengineering.com](http://www.tectonicengineering.com) [jscala@tectonicengineering.com](mailto:jscala@tectonicengineering.com)

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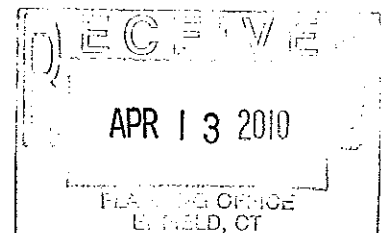


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## NOTICE TO CONTRACTOR – STAGING AREAS

The Contractor is hereby notified that areas available for staging, storage and stockpiling of materials, tools and equipment are limited. For the purposes of this specification “Staging Area” shall include any area used to store materials, stockpiling and equipment for longer than 3 calendar days. The Contractor shall adhere to the following in utilizing the available areas:

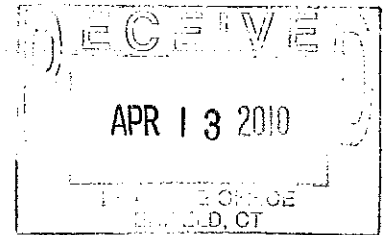
1. No staging areas shall be permitted within the limits of the floodplain as identified on Flood Insurance Rate Mapping of the Town.
2. Stockpiles of earth materials shall be temporarily stabilized and contained within sedimentation control fence or covered to prevent erosion and sediment transport from rain and surface flow.
3. No staging areas shall be within any wetland limits.
4. Concrete washout shall not occur within 50 feet of a regulated area or within the 200 foot buffer area without written approval from the Engineer. Generally, concrete washout shall be positively controlled and contained to prevent contamination from entering any regulated area.
5. The worksite shall be kept clean at all times to prevent litter and other debris from entering the regulated wetlands and floodplain areas. At least two trash receptacles shall be provided and periodically emptied.
6. Pedestrian access to the adjacent park shall be provided at all times unless specifically authorized by the Town in writing. At a minimum a smooth 4 foot wide path shall be provided from Powder Hill Road with appropriate way finding signs installed. The path shall be physically separated from the contractors operations and staging area with a temporary fence.
7. Access to private properties shall be maintained unless authorized in writing.
8. The project is located within an Aquifer Protection Area subject to Level “A” Mapping regulations. The contractor shall adhere to the “Aquifer Protection Area Regulations of the Town of Enfield”. The Contract may be required to register, provide Registration Fee(s) and post a Bond as part of this requirement.
9. Any Staging Area used shall be returned to the original condition unless specifically directed or authorized in writing.
10. The Contractor shall have a Spill Kit available on site for immediate use. The Spill Kit shall contain the following minimum items:
  - NS® Spill Control, 55 Gallon Universal Sorbent Wheeled Overpack Spill Kit, 50 Gal. Capacity or approved Equal
    - (10)–3" x 48" socks
    - (4)–3" x 10' socks
    - (50)–15" x 17" pads
    - (4)–pillows
    - (50)–wipers
    - (5)–disposal bags and ties
    - (5)–tamperproof seals
    - (2)–pair nitrile gloves
    - (1)–emergency response guidebook





11. The Contractor shall conform to the 2002 CT E&S Guidelines or as directed by the engineer.

The cost of adhering to these requirements shall not be measured for payment but shall be included in the general cost of the project.



## **NOTICE TO CONTRACTOR – CONSTRUCTION SEQUENCE**

The Contractor is hereby notified that the protection of the environment is paramount to the success of this project. The contractor shall adhere to the following sequencing unless specifically authorized by the Engineer:

1. The Contractor shall attend the preconstruction meeting as directed by the Engineer.
2. Prior to any tree cutting, the Contractor shall schedule and attend a tree cutting meeting with Town Staff and the Engineer and Design Engineer. Prior to this meeting the Contractor shall mark each tree to be removed or trimmed. In addition, the slope limits shall be identified. The meeting shall be held at the project site.
3. Install sedimentation control fencing and at the slope limits as shown on the plans or as directed by the Engineer. Install other controls as necessary.
4. Establish staging areas and protective fences as approved and directed.
5. Clear and Grub the site. Dispose of stumps and debris in accordance with applicable regulations. Strip and stockpile topsoil from all disturbed areas for future reuse.
6. Install the drainage outlet preformed scour hole as shown on the plans for later use during dewatering activities.
7. Install debris containment measures to prevent bridge demolition materials from falling into the River and wetland areas. The debris containment measures shall be designed by the Contractor based on his demolition methods. The proposed containment measures shall be approved by the Engineer. The Engineer may require modifications, repairs and/or additional measures.
8. Remove existing bridge superstructure.
9. Install turbidity curtains as shown on the plans.
10. Construct temporary sedimentation basins and/or other water handling features. These features shall be designed and located to accommodate the Contractor operations and activities.
11. Install Cofferdams and temporary shoring as needed to isolate the work areas and protect the excavation.
12. Remove existing abutments and wingwalls then perform excavation to the line and grade shown on the plans. Natural streambed material shall be stockpiled as directed for reuse.
13. Construct the footings in the dry.
14. Construct the abutments and wingwalls then backfill as needed, including the placement of riprap and streambed materials. Grade and stabilize slopes per plan or as directed by the Engineer.
15. Remove cofferdams then turbidity curtains.
16. Install bridge superstructure, approach slab and finish roadway and drainage.
17. Place topsoil and establish grass and install plantings.
18. Inspect and clean drainage system and outlets.
19. Remove temporary sedimentation control fences and other measures once all disturbed areas are stabilized.

The Contractor shall maintain and adjustment the temporary controls to ensure proper performance to protect the environment. The sediment controls shall be carefully inspected prior to any storm event. For large events, periodic inspection during the event may be required as directed by the Engineer. The Contractor shall repair, modify or supplement the systems as necessary and directed.

Bednaz, Katie

XIW-10-04

**From:** Scala, Jeff [JScala@tectonicengineering.com]  
**Sent:** Friday, April 09, 2010 3:17 PM  
**To:** Bednaz, Katie; Hawkes, Piya  
**Cc:** Estanislau, Anthony; Haouchine, Houcine  
**Subject:** South Maple Street - Construction Sequence and Permits  
**Attachments:** NTC - Permits-Permit Application.pdf; NTC - Construction Sequence.pdf

Katie,

Please see attached spec for the construction sequencing and permits

Jeff Scala  
*Vice President - Regional Director*

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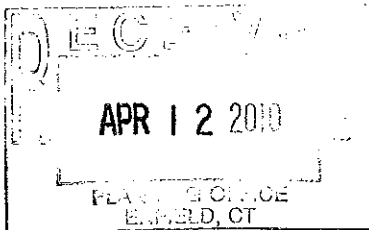
1344 Silas Deane Highway, Suite 500 Rocky Hill, CT 06067  
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4/12/2010

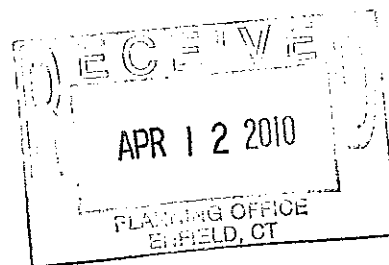
## NOTICE TO CONTRACTOR – PERMITS/PERMIT APPLICATION

The Contractor is hereby notified that all permit and permit applications contained herein and required shall be made part of this Contract, and that the Contractor shall be bound to comply with all requirements of such permits and permit applications as though the Contractor were the permittee. If at the time the permit is received its contents differ from that which is outlined in the application, the permit shall govern. Should the permit be received after the receipt of bids and the permit requirements significantly change the character of the work, adjustments will be made to the contract in accordance with the appropriate articles in Section 1.04. The requirements and conditions set forth in the permit application shall be binding on the Contractor just as any other specifications would be. Contractor to abide by construction staging plans and water handling information provided. Any proposed changes must be approved by Controlling Authority.

The following permits are required or may be required for this project:

- Town of Enfield Inlands Wetlands
- Flood Management Certificate
- Army Corps Certification
- General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities
- Town of Enfield Aquifer Protection Area Permit
- Town of Enfield Building Permit
- Oversize/Overweight Vehicle Permits

This list is for information purposes only as other permits may be necessary.



**Bednaz, Katie**

XIW-10-04

**From:** Scala, Jeff [JScala@tectonicengineering.com]  
**Sent:** Thursday, April 08, 2010 1:38 PM  
**To:** Bacho, Louis D  
**Cc:** Estanislau, Anthony; Haouchine, Houcine; Hawkes, Piya; Bednaz, Katie  
**Subject:** RE: 48-192 So Maple St Bridge o / Scantic R

.OU,

Please see responses below. In addition, the following will be added/ modified based on our Meeting with Enfield I/W Commission:

1. Specifications and details on material storage/stockpile and staging areas
2. Concrete washout area controls in the form of a specification
3. Specification on the temporary water handling facilities, including but not limited to: temporary sedimentation basins, overflow areas and basic procedures the contractor needs to follow to protect the overflow area of the temp. basins and other areas
4. Add the regulated area lines to the plans as the Town regulates the wetlands and 200 feet of the upland area
5. Provide grading / contours for the new outfall northeast of the bridge
6. Detailed narrative on the stock piling and placement of the natural streambed material

Jeffrey A. Scala, P.E.

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**From:** Bacho, Louis D [mailto:Louis.Bacho@ct.gov]  
**Sent:** Saturday, March 27, 2010 7:54 AM  
**To:** Scala, Jeff; Haouchine, Houcine  
**Cc:** Estanislau, Anthony  
**Subject:** FW: 48-192 So Maple St Bridge o / Scantic R

Jeff & Houcine,

I'm forwarding comments from Environmental Planning following their review of the Scantic River Bridge.

.OU

*Louis D. Bacho, P.E.*  
*Project Engineer*  
*CT Department of Transportation*  
*Consultant Design - Bridge*  
*2800 Berlin Turnpike*  
*Newington, CT*  
*Phone: (860) 594-3212*  
*Fax: (860) 594-3373*  
*Email: [louis.bacho@ct.gov](mailto:louis.bacho@ct.gov)*

4/8/2010

this to show overland flow.

17. STR-19. The location and method of the temporary basin does not make sense. The method suggests two pumps for each basin. One should be used from the excavated pit to the basin. The discharge of water should be in an upland location and allowed to release naturally overland, but not pumped out. **[J. Scala]** Two pumps are not the intent. The arrows are intended to show the general direction of flow.
18. General. I concur with Kim's statement below regarding the use of a turbidity control curtain. Maybe at the perimeter of the cofferdams, but not across the river. **[J. Scala]** We feel that a turbidity curtains are needed and have modified the location to contain each work area only.

This concludes my review.

Thanks. Drew

---

**From:** Lesay, Kimberly C  
**Sent:** Tuesday, March 23, 2010 11:14 AM  
**To:** Cutler, David A; Bacho, Louis D  
**Cc:** Alexander, Mark W; Piraneo, Andrew  
**Subject:** 48-192 So Maple St Bridge o / Scantic R

Dave / Lou - I have reviewed the final plans dated March 12, 2010 and offer the following comments:

- Please coordinate further with Drew, but I don't believe you need both deep sumps in all the basins, plus the GPS unit. Likely one or the other would suffice unless the Town wants to do this on their own? The GPS should be off line, and is currently depicted on-line.
- The Dept typically does not call out the use of turbidity curtains in streams and rivers. they are typically not useful. however, in this case, during placement of the cofferdam. it may be. Again, more of the Town's call, and please coordinate further with Drew.
- Your memo states a "tight" schedule. Has the FM MOU application been submitted yet? I don't believe I've seen it come through our unit yet. This would be the next step to keep this one moving. As determined at the Project Manager's Meeting, the project appears Category 1 eligible under the ACOE PGP, and we already have concurrence from DEP Fisheries.

Any questions, give me a call - Thanks, Kim

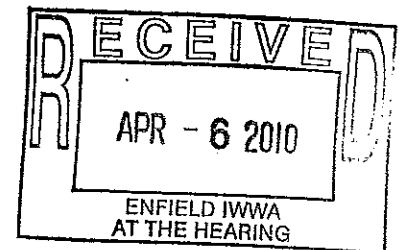
Kimberly Lesay  
 Environmental Planning Division  
 Department of Transportation  
 2800 Berlin Turnpike  
 PO Box 317546  
 Newington, CT 06131-7546  
 phone (860) 594-2933  
 fax (860) 594-3028  
[Kimberly.Lesay@ct.gov](mailto:Kimberly.Lesay@ct.gov)

*"Today's problems cannot be solved if we still think the way we thought when we created them."- Albert Einstein*

**DRAINAGE DESIGN**  
**FOR**  
**RECONSTRUCTION OF SOUTH MAPLE STREET BRIDGE**  
**OVER SCANTIC RIVER**  
**ENFIELD, CONNECTICUT**

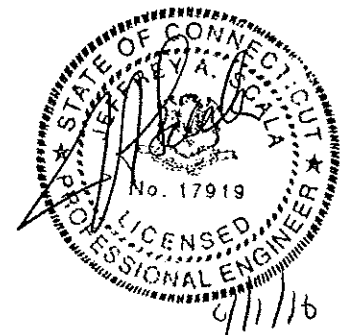
**PROJECT NO. 48-192**

**March 25, 2010**



**PREPARED BY:**

**TECTONIC ENGINEERING & SURVEYING**  
**1344 Silas Deane Highway**  
**Suite 500**  
**Rocky Hill, CT 06067**





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### APPENDICES

- A. Location Map
- B. Schematic
- C. Drainage Area Map
- D. Hydrologic Computations - Time of Concentration
- E. Gutter Flow Analysis
- F. Storm Water and Hydraulic Grade Line Computations
- G. Outlet Protection Computations
- H. Stormwater Quality Computations
- I. Field Condition Survey
- J. Drainage Checklists
- K. Backup Reference Materials

## **A. PROJECT DESCRIPTION**

The South Maple Street Bridge over the Scantic River is located 1750 ft south of State Route 190 (Hazard Avenue). The existing 70-foot-long, 15-foot-wide structure has a single 63-foot-long span between abutments, with a four-panel through steel Warren truss superstructure. Each of the two main trusses has a box girder top chord and paired angle lower members, all originally with riveted connections which have been replaced with bolts. The floor system of rolled I-beams includes three floor beams carrying six stringers.

The deck, with an upper surface about 15 feet above the Scantic River, consists of a bituminous concrete wearing surface over a reinforced concrete deck, spanning 2.5 feet between the stringers. The deck has a 1.5-foot-high concrete parapet on either side topped with galvanized steel guardrails attached with vertical W-shape members.

The abutments and U-type wingwalls are gravity type, constructed of reinforced concrete (c1956) and stone masonry (c1925) and founded on bedrock. The southern abutment is penetrated by two 5-foot diameter pipe culverts, and both abutments have smaller pipe culverts, to pass high river flows.

The bridge was built in 1925, repaired in 1931, repaired again with abutment reconstruction in 1956, heavily reconstructed in 1978-79, and repaired in 2003 with additional bolts. The repairs begun in 1978 greatly altered the superstructure, and included welded-on reinforcement of most major members, the addition of sway braces on outriggers, elimination of the lower chord in the end panels, and anchor blocks welded onto the truss ends to support steel rods which function as the lower chords.

North of the bridge, South Maple Street rises gradually towards Hazard Avenue with a paved width of approximately 25 feet, and passes the intersection of Dust House Road which meets South Maple Street from the west about 270 feet from the bridge. North of Dust House Road, South Maple Street traverses a steeper late glacial stream terrace.

The proposed bridge replacement project will include removal of the existing bridge and most or all of its abutments, construction of a new 45-foot-wide bridge with a single 82-foot span and concrete abutment, and reconstruction of existing bridge approaches to a point about 40 feet north of Dust House Road to the north and to a point about 135 feet from the south end of the new bridge. There will be virtually no change in existing grade south of the river. North of the river, the grade will rise from 0-1.8 feet from north to south.

A gravel parking area (7 spaces) will be provided on the south west of the bridge with a sidewalk connecting to the proposed bridge area.

Safety and general roadway improvements will include, partial roadway reconstruction, minor widening to provide for a uniform pavement width and replacement of existing curbing.

## **B. PURPOSE OF REPORT**

The purpose of this report is to provide documentation relating to the analysis of the proposed drainage, ensure that the design meet the requirements to protect public safety, justify public funding expenditures, and provide future reference.

## **C. DESIGN CRITERIA**

The design criteria used in all drainage evaluations was extracted from the Connecticut Department of Transportation (CDOT) *Drainage Manual, October 2000*, unless otherwise noted. In addition, the design storm for the 25-yr rainfall was used in the calculations per the Town of Enfield requirements.

The Rational Method is the design discharge methodology used to determine run-off for proposed drainage design, since contributing drainage areas are less than 81 hectares (200 acres).

The existing enclosed drainage facilities will be utilized wherever feasible while keeping local drainage separate from State roadway drainage as much as possible.

## **D. CONTRIBUTING DRAINAGE AREAS**

Contributing drainage areas to the proposed improvements storm sewers have been delineated on 1:50 scale on topographic mapping provided by the Town and supplemented by the project mapping. The total contributing drainage area to the site is 6.0 acres.

## **E. TEMPORARY DRAINAGE**

Temporary drainage will continue to utilize the existing systems as much as possible during construction. The road will be closed for the duration of the construction. Temporary facilities will be maintained by the Contractor to protect the wetlands and watercourse.

## **F. DRAINAGE CONDITION SURVEY**

A field survey of the existing system was conducted. Generally, the existing pipes and structures inspected are in fair to poor condition, therefore will be replaced within the project limits.

## **G. DESIGN SUMMARY**

The system has been designed to convey the 25- yr rainfall event as required by the Town's standards. The rainfall intensities uses are from published values from the CTDOT Drainage manual using the time of concentration for the contributing areas.

The location of each inlet structure was selected to control spread in the gutter line, minimize water bypass at the intersection, minimization of bypass onto the bridge and to avoidance of underground utilities. The outlet location was selected based on convenience and available rights of way. Each catch

basin will be provided with a 4' sump to trap sediments. In addition, the Local Inland Wetland Commission has required a Gross Particle Separator to be included in the project.

The selection of the pipe materials to be used on this project has been based on a number of factors including but not limited to:

1. availability,
2. durability,
3. hydraulic capacity,
4. site conditions,
5. and costs.

The qualitative analysis of the above factors on this project does not provide for a clear choice of the preferred materials. The costs associated with each material and installation has been compared. Concrete pipes in the sized needed for this project range from \$55-75 per linear foot. The cost for HDPE ranges from \$27-38 per linear foot. The cost of trenching would be similar regardless of the materials used. The quantity of bedding material might be reduced if concrete pipe is used but would not offset the unit price difference of the pipe. In addition, to the cost differences the Town of Enfield has expressed that it prefers the HDPE pipe. The use of HDPE Pipe with standard precast structures has been selected as the preferred materials for this project.

The design will convey the design storm while maintaining adequate freeboard.

The outlet velocities have been minimized to the greatest extent possible but due to the very smooth nature of plastic pipe is still high. To protect the outlet from the high velocity, a preformed scour hole has been designed.

## **APPENDIX A**

### **LOCATION MAP**

46 53228m N.

46 51619m N.

46 50010m N.

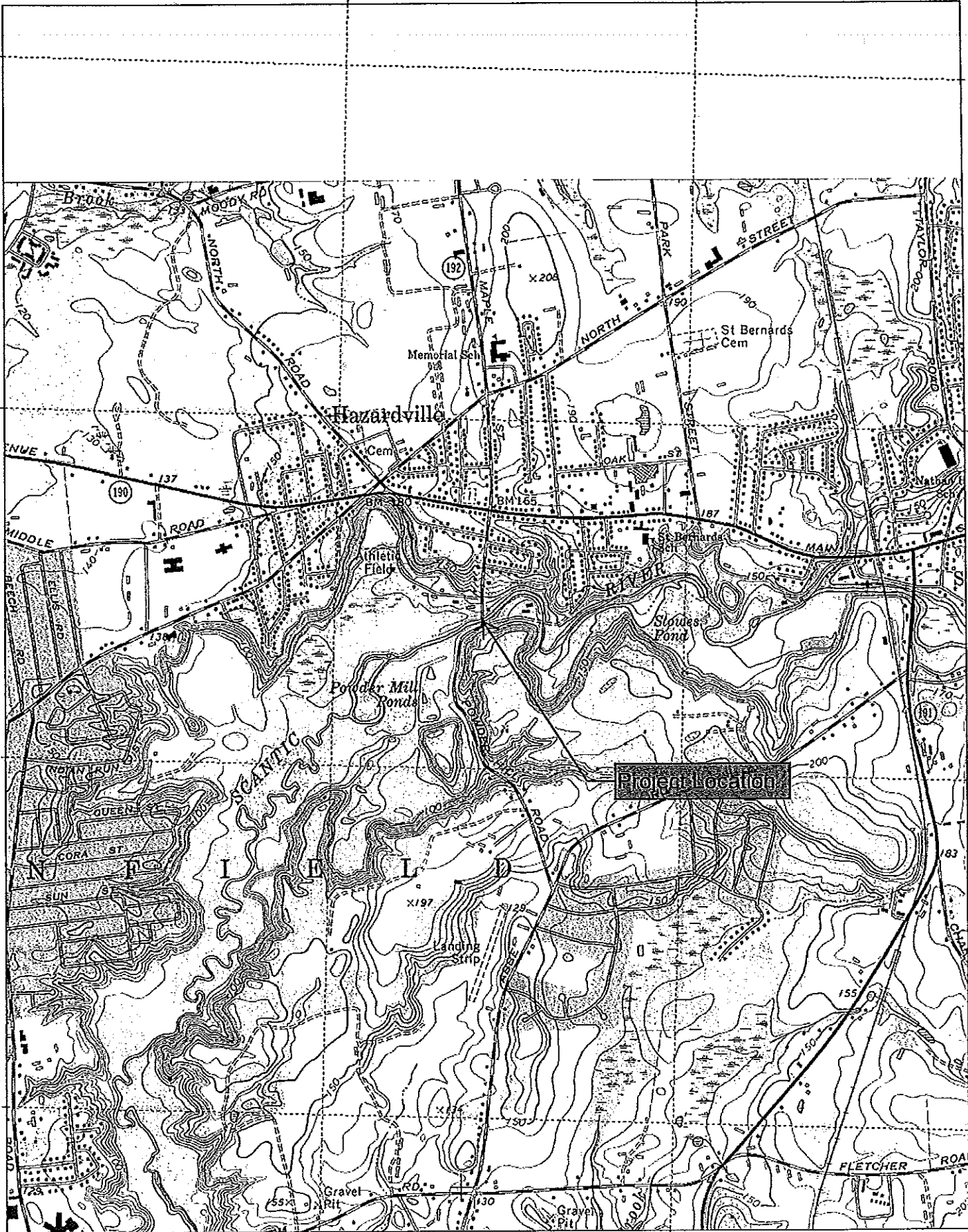
46 48401m N.

46 53228m N.

46 51619m N.

46 50010m N.

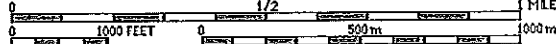
46 48401m N.



703133mE.

WGS84 Zone 18T 704742mE.

MN 14° TN

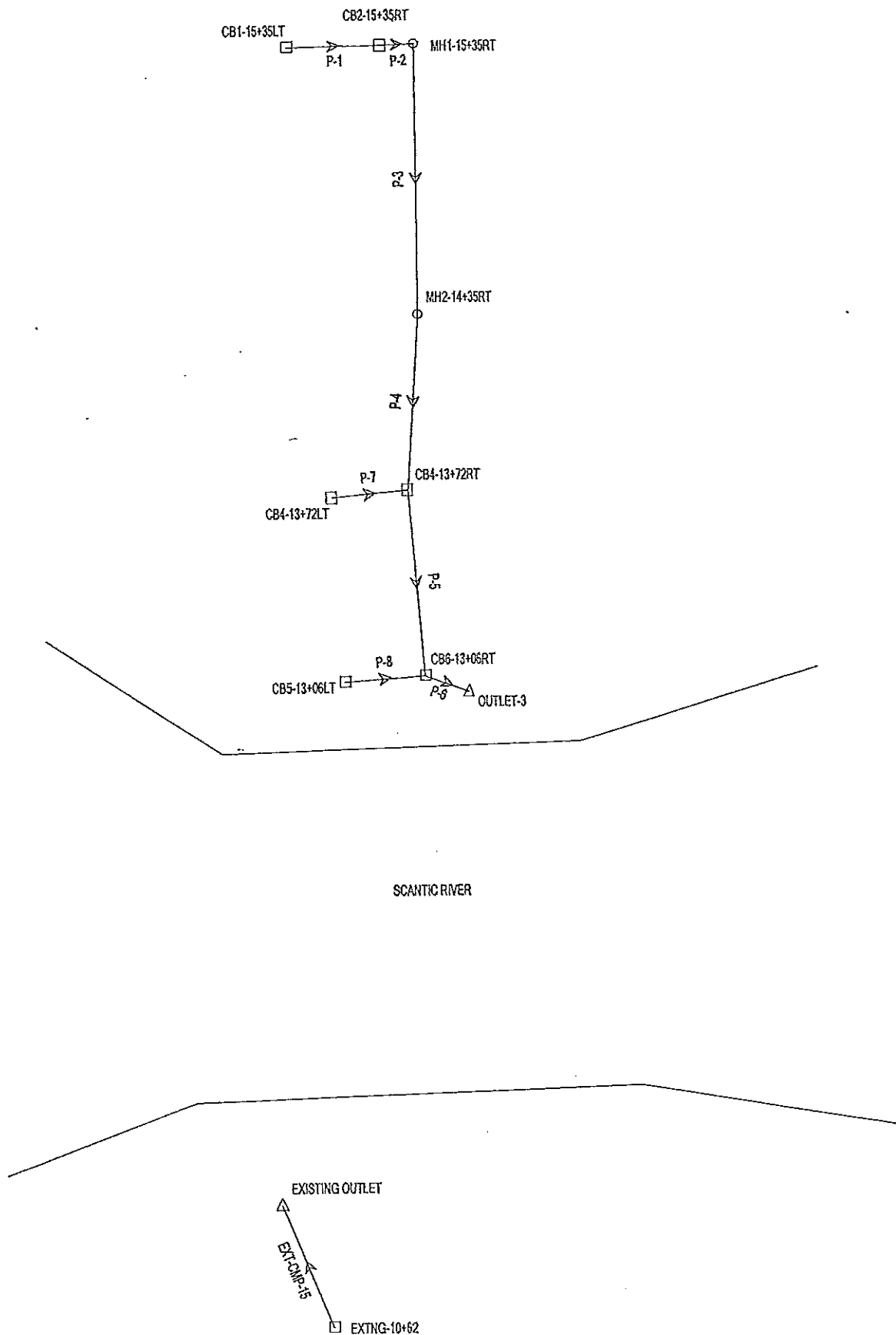


Map created with TOPOI® ©2003 National Geographic (www.nationalgeographic.com/topo)

## **APPENDIX B**

### **SCHEMATIC**

# Scenario: South Maple Street 25 YEAR STORM





**APPENDIX C**  
**DRAINAGE AREA MAP**

# CTDEP INLAND FISHERIES DIVISION COORDINATION TRANSMITTAL MEMORANDUM

DOT Project #: 048-192 Town: Enfield Bridge #: 03972  
Waterway: Scantic River Drainage Basin Name & Number: Scantic River - 4200  
Project Description / Scope of work: Bridge Replacement (see attached narrative)

## Initial Coordination

The following information is provided as required:

Plan /submittal date : \_\_\_\_\_

- ☒ Legible location map with project site clearly marked
- ☒ Description of scope of work and if developed, pertinent 1/2 scale plans as deemed relevant.
- ☒ Area photographs

To be completed by CTDEP Inland Fisheries Division and returned to DOT Environmental Planning Division

- ☒ Affect of proposal on our program interests is negligible. No further review is warranted.
- ☐ Additional information is required, a list of requested information is attached.
- ☐ Comments and recommendations are attached.

BDM Initials

1/7/10 Date

## Structure Type Agreement

The following information is provided as required:

Plan date: \_\_\_\_\_

- ☐ Copies of previous correspondence from Fisheries Division
- ☐ If previous recommendations cannot be incorporated, provide narrative explaining why.
- ☐ 1/2 scale plans of pertinent plan sheets including plan view, elevation view, profile and details as deemed relevant.

To be completed by CTDEP Inland Fisheries Division and returned to DOT Environmental Planning Division

- ☒ DEP Fisheries agrees to the structure type presented in the plans.
- ☐ Comments and recommendations are attached.

BDM Initials

1/7/10 Date

## Final Fisheries Sign-Off

\_\_\_\_\_ Check here if project is not FM MOU eligible and will be finalized through DEP IWRD.

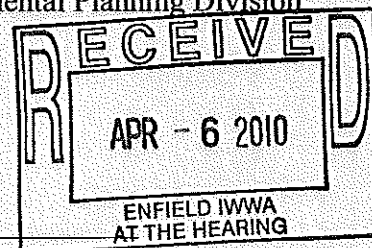
The following information is provided as required:

Plan date: \_\_\_\_\_

- ☐ Copies of all previous correspondence from Fisheries Division
- ☐ If previous recommendations cannot be incorporated, provide narrative explaining why.
- ☐ 1/2 scale plans of pertinent plan sheets including plan view, elevation view, profile and details as deemed relevant.

To be completed by CTDEP Inland Fisheries Division and returned to DOT Environmental Planning Division

- ☐ DEP Fisheries comments have been adequately incorporated into project plans
- ☐ The attached Special Conditions must be incorporated into the contract language



DEP Fisheries Biologist

Date

## Scala, Jeff

---

**From:** Scala, Jeff  
**Sent:** Tuesday, April 06, 2010 3:20 PM  
**To:** Bednaz, Katie  
**Subject:** South Maple Street Bridge  
**Attachments:** Response to comments South Maple St Bridge XIW1004 Review.pdf

Katie,

Attached is a copy of your March 31<sup>st</sup> Memo marked up in red indicating the disposition.

Jeff Scala  
*Vice President - Regional Director*

# **TECTONIC**

Practical Solutions, Exceptional Service

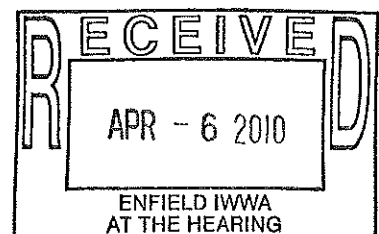
***Planning - Engineering - Construction and Program Management***

1344 Silas Deane Highway, Suite 500 Rocky Hill, CT 06067  
860.563.2341 voice 860.257.4882 fax  
[www.tectonicengineering.com](http://www.tectonicengineering.com) [jscala@tectonicengineering.com](mailto:jscala@tectonicengineering.com)

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Please consider the environment before printing this e-mail.



# Memo

**To:** Enfield Inland Wetlands and Watercourses Agency  
**From:** Katie Bednaz, Assistant Town Planner/Wetlands Agent Information added by Tectonic Engineering  
**CC:**  
**Date:** March 31, 2010 April 5, 2010  
**Re:** Agent Review for XIW-10-04 – South Maple Street Bridge

---

The following are my review comments and observations regarding the Inland Wetland and Watercourses Application XIW-10-04 for the South Maple Street Bridge Reconstruction, plans entitled "Town of Enfield Construction Plans for Replacement of Bridge No. 03972, South Maple Street Over Scantic River from Sta. 10+50.00 to Sta. 15+59.25, Length 509.25 Feet", dated 3/5/10 and 3/8/10, sheets 1-32. In addition the application package and supporting data as submitted and included in the application file has been reviewed.

- 1) The Inland Wetlands application number should be located on all plan sheets. Not included at this time but will include copy of approval and conditions as part of the bid package.
- 2) The following application requirements must be completed:
  - a. According to Section 7.5 b. of the Inland Wetlands and Watercourses Regulations (IWWR) "The land owner's name, address and telephone number and written consent if the applicant is not the owner of the property involved in the application;" No wetland impacts to private properties.
  - b. According to Section 7.5 h. "Names and addresses of abutting property owners as of date no earlier than 30 days before the date the application is submitted to the Agency;" Notice have been sent out.
  - c. According to Section 7.6 c. "The soil scientist shall prepare a report that includes the name of the applicant and project, the location of any limits of the property investigated, the dates of the soil investigations, a brief soil description of each soil mapping unit investigated, the set of the consecutive numbers used on survey types to identify the wetland boundaries appearing on the site plan are to the best of his knowledge true and accurate;" It is also requested that the signature and certification by the soil scientist be located on the project plans where the existing conditions are shown. A soils scientist report has been prepared and provided as part of our submission. We have reviewed the survey information shown on the maps provided and the limits are accurately depicted..
- 3) Grading and the limits of clearing should be shown for all of the catch basin outfalls. The limits of work are shown on the plan provided.
- 4) The limit of the Upland Review Area (URA) needs to be clearly shown on the project plans. The line will be added to a plan and submitted as requested.

- 5) The existing tree line should be shown to the south of the proposed parking area so that the extent of disturbance can be better evaluated. The limits of disturbance are shown. Attached is a aerial photo with the proposed work superimposed.
- 6) The "Wetland Impacts & Mitigation" page of the application states that there will be wildlife habitat accommodation on the north embankment. Please elaborate on what the accommodations are. Per Army Corps requirements we are providing a "shelf" under the bridge that is slightly above the normal highwater line. The intent is to permit animal passage up/down the river without crossing over the road.

It also states that "Placement of natural streambed materials over the riprap" will be done as a mitigation measure. Please explain how this will be accomplished. The riprap is to provide protection of the bridge from highwater velocities. The cover material is placed over the riprap to mimic the existing bottom of the watercourse. The placement of these materials will be accomplished using normal construction equipment.

- 7) Indicate on plans where materials will be stored and how they will be contained. The storage area shall contain a designated concrete washout containment area. Concrete washout can be harmful to wildlife and water quality, therefore it is recommended that it be properly controlled. This is an unusual request for a CTDOT/ Federally funded project as the Contractor is not permitted to washout concrete equipment within the project. In addition, full time inspection personnel are on site at all times monitoring the Contractor's activities. We will add a Notice to Contractor that he must contain the washout to prevent discharge into the regulated area.

7)

- 8) All portable restrooms or other fluid filled equipment are recommended to be stored 100 feet from any resource areas. It is recommended that this be specified on the project plans. The Contractor must have approval before he can install temporary facilities. Considering the site constraints it is very unlikely that this requirement can be reasonably be met. However, no equipment can be stored within the flood limits. Refueling of equipment is also restricted to areas outside of the limits. In addition, the contractor is required to maintain a spill kit on sit at all times.

8)

- 9) The typical erosion control detail needs to be shown on the plans. It is recommended that haybales and silt fence be required within 100 feet of the Scantic River. The project will be referencing the CTDOT Standard Drawings with contain these details. A copy is enclosed.

As always, please contact me with any questions or concerns.

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numbering

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Rocky Hill Trans 12883 ENFIELD\2833-00\dwg\Current-Drawings\RH-CV-283300-6 8.dwg 6/16/2010 6:14:38 PM, Kevin Fuller, 1-2883



0 1 2 3

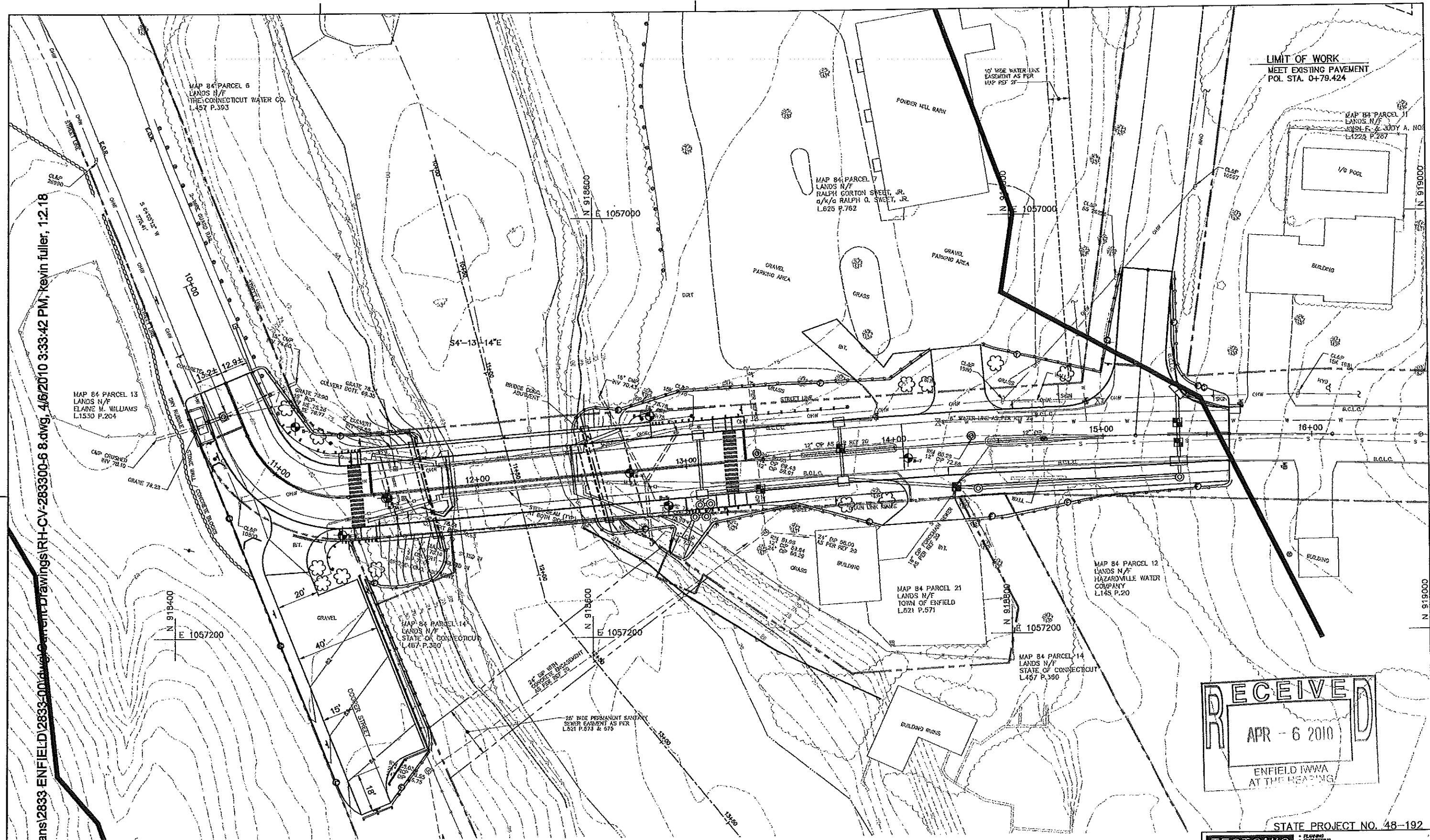
ORIGINAL SIZE IN INCHES

ENFIELD IVWA  
AT THE HEARING

\_\_\_\_\_



F:\Rocky Hill\Trans\2833 ENFIELD\2833-000\dwg\Cement Drawings\RH-CV-283300-8.dwg, 4/6/2010 3:33:42 PM, Kevin Fuller, 1:2.18



RECEIVED  
APR - 6 2010  
ENFIELD TOWN  
AT THE TOWN CLERK'S OFFICE

STATE PROJECT NO. 48-192

**TECTONIC**  
TECTONIC Engineering & Surveying, Inc.  
1344 State Street, Suite 600  
Rocky Hill, CT 06067  
Phone: (860) 543-2341  
Fax: (860) 267-4582  
www.tectonicengineering.com

CONSTRUCTION PLAN

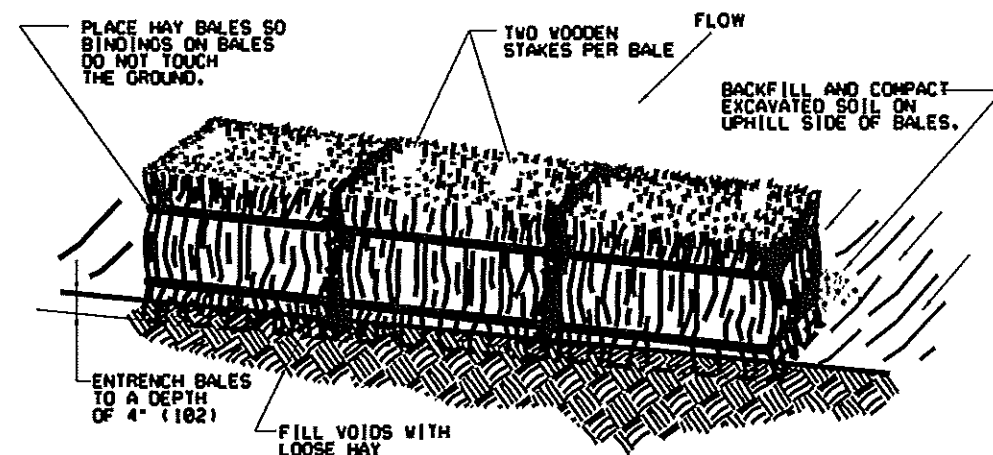
TOWN OF ENFIELD  
REPLACEMENT OF THE SOUTH  
MAPLE STREET BRIDGE  
OVER SCANTIC RIVER

Date: 3-09-10  
Scale: 1"=20'  
Work Order: 2833.00  
Drawing No.: CON-1  
Sheet No.: 6

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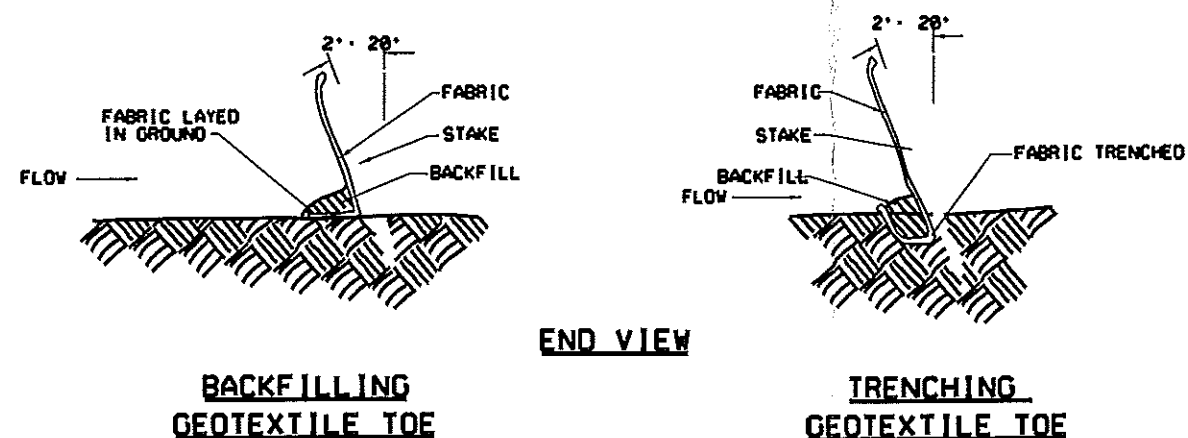
Rev	Date	Revision	Approved	Designed by	Drawn by	Checked by	Date
				H.J.L.	K.R.F.	J.A.S.	
				Purpos	Released by	Date	
				For Contract			
				For Approval			
				For Bid			
				For			



**HAY BALE SYSTEM**

**GENERAL NOTES:**

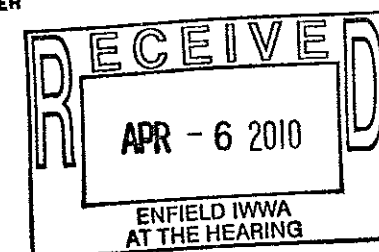
1. HAY BALES SHALL NOT BE USED IN A WATERCOURSE.
2. HAY BALES SHALL BE ENTRENCHED 4" (102) AND TIGHTLY BUTTED TOGETHER. REMOVE HEAVY BRUSH AND FILL ALL VOIDS WITH LOOSE HAY.
3. WOOD STAKES SHALL HAVE A MINIMUM CROSS-SECTION SIZE OF AT LEAST 1" (102) X 1" (102) AND MINIMUM LENGTH OF 4' (1219).
4. CLEAN OUT ACCUMULATED SEDIMENT WHEN ONE-HALF (1/2) OF THE ORIGINAL HEIGHT OF THE HAY BALE FENCE, AS INSTALLED, BECOMES FILLED WITH SEDIMENT OR AS DIRECTED BY THE ENGINEER.
5. NOT TO BE USED IN THE VICINITY OF URBAN AND RESIDENTIAL AREAS.



**GEOTEXTILE FENCE SYSTEM**

**GENERAL NOTES:**

1. GEOTEXTILE FENCE SHOULD BE PLACED SO THE FENCE LEANS TOWARD THE SOURCE OF SEDIMENT.
2. MAXIMUM SPACING FOR WOODEN STAKES OR STEEL POSTS IS 10.0' (3048).
3. WOOD STAKES SHALL HAVE A MINIMUM CROSS-SECTION SIZE OF 1.5" (457) X 1.5" (457) AND MINIMUM LENGTH OF 4' (1219). STEEL POSTS SHALL BE AT LEAST 0.5 LB. PER FOOT (0.22KG PER CM) WITH A MINIMUM LENGTH OF 4' (1219).
4. WOODEN STAKES OR STEEL POSTS SHALL BE DRIVEN TO A MINIMUM OF 1' (305) INTO THE GROUND.
5. 6" (152) OF GEOTEXTILE SHALL BE BURIED BY BACKFILLING OR TRENCHING AND AT LEAST 2.5' (762) IN HEIGHT OF GEOTEXTILE SHALL BE EXPOSED.
6. FABRIC SHALL BE JOINED ONLY AT A SUPPORT POST WITH A MINIMUM OF 6" (152) OVERLAP AND SECURITY SEALED.
7. UPON RE-ESTABLISHMENT OF GROUND COVER IN DISTURBED AREAS AND WHEN DIRECTED BY THE ENGINEER, OR UPON FINAL INSPECTION FENCE AND ANY SEDIMENT SHALL BE REMOVED. AT NO TIME WILL THE FENCE REMAIN IN PLACE AFTER PROJECT COMPLETION.
8. GEOTEXTILE FENCE SHALL NOT BE USED IN A WATER COURSE.
9. ONLY GEOTEXTILE FROM THE DEPARTMENTS APPROVED PRODUCT LIST SHALL BE USED.
10. BACKFILLING OF GEOTEXTILE SHALL ONLY BE USED WHEN GROUND IS FROZEN OR WHERE OTHER OBSTRUCTIONS ARE ENCOUNTERED THAT PROHIBIT TRENCHING, IE. STUMPS OR ROCKS.
11. CLEAN OUT ACCUMULATED SEDIMENT WHEN ONE-HALF (1/2) OF THE ORIGINAL HEIGHT OF THE GEOTEXTILE FENCE, AS INSTALLED, BECOMES FILLED WITH SEDIMENT OR AS DIRECTED BY THE ENGINEER.



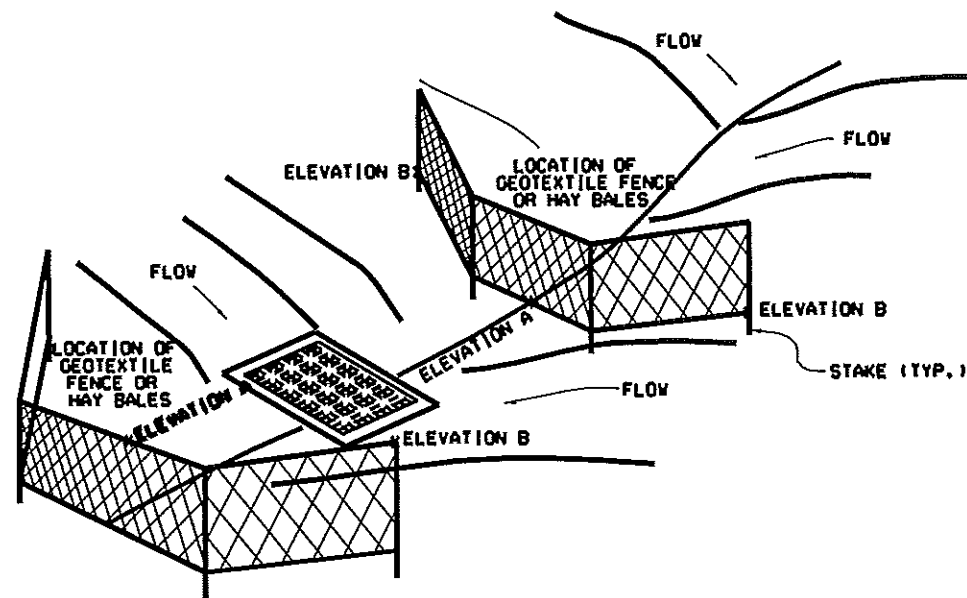
ALL METRIC DIMENSIONS ARE IN MILLIMETERS (MM) UNLESS OTHERWISE NOTED

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.		DESIGNED BY: _____ CHECKED BY: _____ NTS		STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION		SIGNATURE/ BLOCK: _____ OFFICE OF ENGINEERING APPROVED BY: _____ DATE: _____		PROJECT TITLE: _____		DRAWING NO.: _____ SHEET NO.: _____	
REV. DATE: _____ REVISION DESCRIPTION: _____ SHEET NO.: _____ PLOTTED DATE/TIME: _____		FILE NAME: 021166		DRAWING TITLE: _____ SEDIMENTATION CONTROL SYSTEM DETAILS		PROJECT NO.: _____		DRAWING NO.: _____		SHEET NO.: _____	



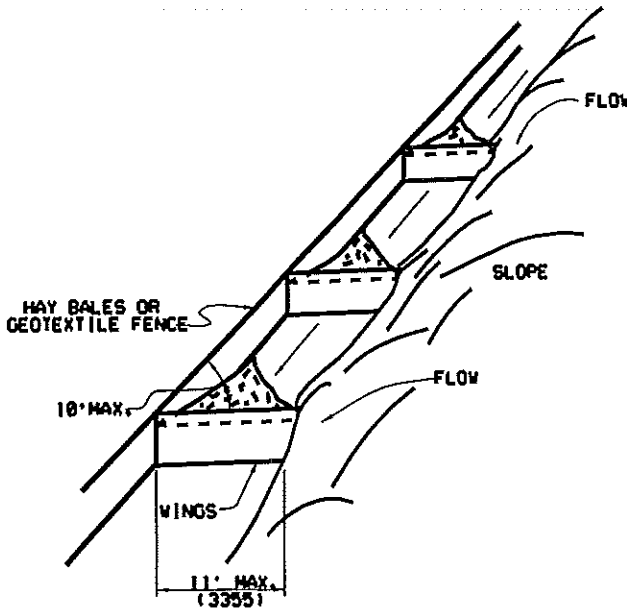
GENERAL NOTES:

1. THE CONTRACTOR SHALL MAINTAIN THE EARTHEN BERM AS DIRECTED BY THE ENGINEER.
2. WHEN USING A SEDIMENTATION CONTROL SYSTEM ALONG THE TOE OF SLOPE, ADD WINGS TO PREVENT SEDIMENT FROM MOVING ALONG THE FENCE AND OFF THE SITE. MINIMUM SPACING FOR WINGS IS 25' (7620).
3. CATCH BASIN ON SLOPE SHOULD NOT BE RINGED. THE SPACING OF SEDIMENTATION CONTROL SYSTEM SHALL VARY WITH SLOPE.
4.  $ELEVATION\ B + A \cdot 12" (305)\ MIN.$



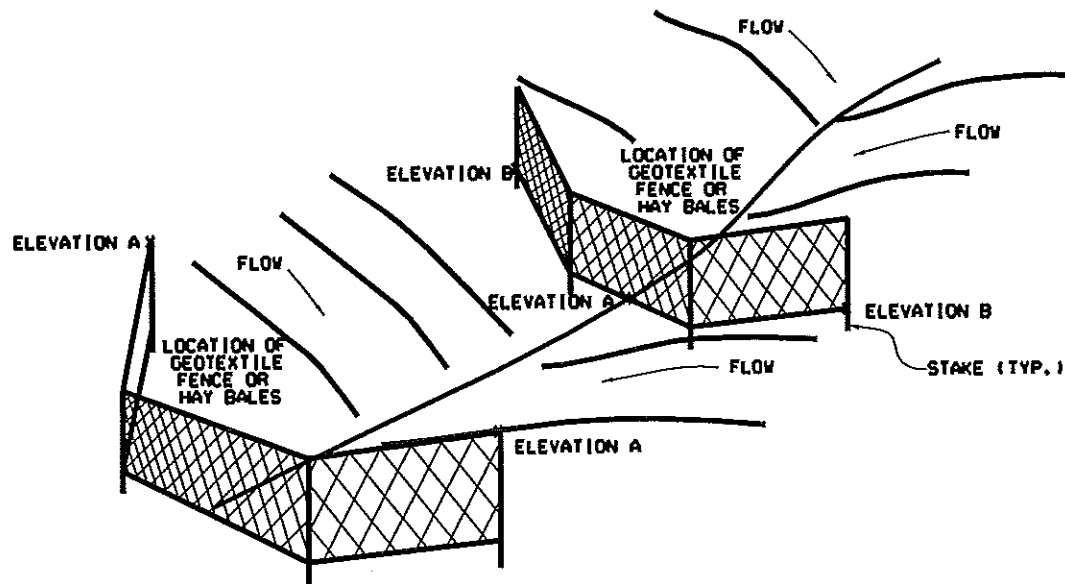
TREATMENT FOR A  
CATCH BASIN ON A SLOPE

(SEE NOTE 4)



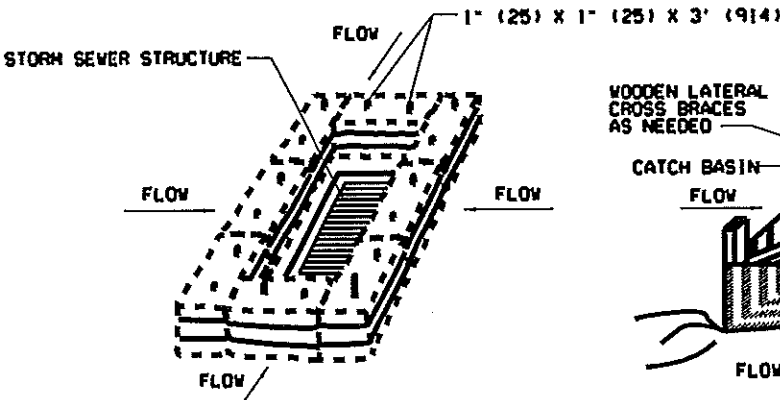
TREATMENT AT TOE OF SLOPE

(SEE NOTE 3)

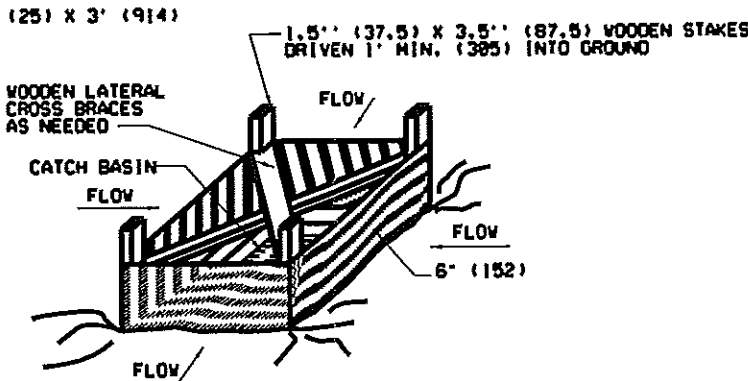


CHECK DAM

(SEE NOTE 4)

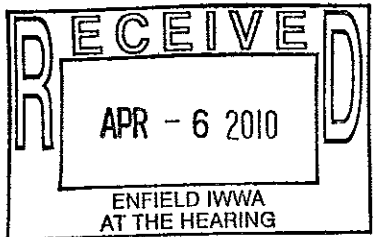


HAY BALE  
AT CATCH BASIN



GEOTEXTILE FENCE  
AT CATCH BASIN

TREATMENT FOR A  
CATCH BASIN IN A DEPRESSION



ALL METRIC DIMENSIONS ARE IN MILLIMETERS (MM) UNLESS OTHERWISE

REV. DATE	REVISION DESCRIPTION	SHEET NO.	PLOTTED DATE	DESIGNER/DRAFTSMAN	STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION	ENGINEER OFFICE OF ENGINEERING	PROJECT TITLE	TOWN	PROJECT NO.
				NTS					
				THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.				DRAWING TITLE: SEDIMENTATION CONTROL TREATMENT DETAILS	

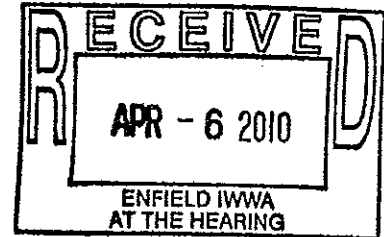
# SOIL SCIENCE AND ENVIRONMENTAL SERVICES, INC.

Soil Science • Ecological Studies • Hazardous Waste Assessments • Project Planning • Soil & Water Testing

KENNETH C. STEVENS, Jr.  
President

December 10, 2002

State of Connecticut DEP  
Natural Diversity Data Base  
79 Elm Street, Store Level  
Hartford, CT 06106-5127



Re: Bridge Replacement, South Maple Street, Enfield , CT

Dear Sir/Madam:

Our firm is providing environmental consultation for the above-referenced site which is a proposed bridge replacement located in Enfield, CT. The approximate areas for review are highlighted on the enclosed USGS topographic map (Broadbrook, CT Quadrangle).

I am writing you to request information regarding the status of populations of Connecticut "Species of Special Concern" or Federal Endangered and Threatened Species, Natural Area Inventory Sites, Wetlands of Special Concern, Natural Area Preserves, and National Natural Landmarks on or around the highlighted area.

This information will be used only for the purpose of our report. I will inform our client and appropriate regulatory agencies only of the presence or absence of species afforded protective status, not their location(s).

Thank you very much for your assistance.

Sincerely,

SOIL SCIENCE AND ENVIRONMENTAL SERVICES, INC.

Jennifer L. Beno  
Biologist



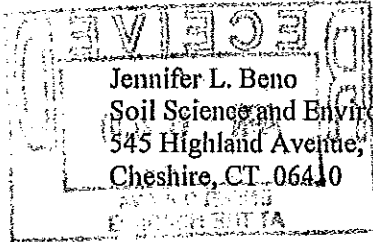
STATE OF CONNECTICUT  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
ENVIRONMENTAL AND GEOGRAPHIC INFORMATION CENTER

79 Elm Street, Store Level  
Hartford, Connecticut 06106-5127  
Natural Diversity Data Base



JAN - 1 2002

December 20, 2002



Jennifer L. Beno  
Soil Science and Environmental Services, Inc.  
545 Highland Avenue, Route 10  
Cheshire, CT 06410

Re: Bridge Replacement, South Maple  
Street, Enfield, CT

Dear Ms. Beno:

I have reviewed Natural Diversity Data Base maps and files regarding the area delineated on the map you provided and listed above. According to our information, there are no known extant populations of Federal or State Endangered, Threatened or Special Concern Species that occur at the site in question.

Natural Diversity Data Base information includes all information regarding critical biologic resources available to us at the time of the request. This information is a compilation of data collected over the years by the Environmental & Geographic Information Center's Geological and Natural History Survey and cooperating units of DEP, private conservation groups and the scientific community. This information is not necessarily the result of comprehensive or site-specific field investigations. Consultations with the Data Base should not be substituted for on-site surveys required for environmental assessments. Current research projects and new contributors continue to identify additional populations of species and locations of habitats of concern, as well as, enhance existing data. Such new information is incorporated into the Data Base as it becomes available.

Please contact me if you have further questions (424-3592). Thank you for consulting the Natural Diversity Data Base.

Sincerely,

Dawn McKay  
Biologist/Environmental Analyst III

DMK/md

# SOIL SCIENCE AND ENVIRONMENTAL SERVICES, INC.

Soil Science • Ecological Studies • Hazardous Waste Assessments • Project Planning • Soil & Water Testing

KENNETH C. STEVENS, Jr.  
*President*

December 6, 2002

ATTN: Glenn Jarvis  
Tectonic / Keyes Associates  
1344 Silas Dean Highway, Suite 500  
Rocky Hill, CT 06067-1349

Re: South Maple Street Bridge over Scantic River,  
Enfield, CT  
Client Job No. 2833.00  
SS & ES Job # 2002-642-CT-ENF-3

Dear Mr. Jarvis:

In accordance with your request, Soil Science and Environmental Services, Inc. conducted a site inspection on November 25, 2002 for the purpose of wetland identification. Thomas W. Pietras, Professional Wetland and Soil Scientist, conducted the investigation. The project site is located to the south of Hazardville in the town of Enfield (Figure 1). The Scantic River flows in a southwesterly direction under South Maple Street. Historically, the area contained factory mills, dams and canals. A large pond, known as Powder Mill Pond, was formerly located to the south of the bridge. The factories, dams and ponds are no longer present. A former sandy and gravel pit was located on the hillside to the south of the bridge. Presently, land features within the project area include the Scantic River floodplain, woodlands, and a mix of residential and commercial land uses. A spade and auger were used to dig test holes for soils identification. During the inspection the vegetation, soils and hydrologic indicators were carefully examined in the project area.

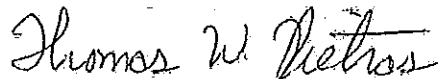
Wetlands are defined differently by the State of Connecticut and the Federal Government. According to Connecticut State Statutes, Inland Wetlands are defined as land, including submerged land, (but not tidal wetlands), which consist of any of the soil types designated as poorly drained, very poorly drained, alluvial and floodplain by the National Cooperative Soil Survey (Inland Wetlands and Watercourses Act, Sections 22a-36- through 22a-45 of the Connecticut General Statutes). The Federal Government defines wetlands as: "Those areas that are inundated or saturated by surface or ground water at a frequency and duration to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (Corps of Engineers Wetlands Delineation Manual, 1987). The methodology established by the Federal Government uses a three parameter approach utilizing hydrologic indicators, hydrophytic vegetation and hydric soils for identifying wetlands.

Inland Wetlands are present within the project area as floodplain soils along the river, poorly to moderately well drained soils which formed under Powder Mill Pond and poorly to very poorly drained soils in an excavation of the old sand pit. Very narrow bands of floodplain soils are present along the sides of the Scantic River in the vicinity of the bridge. The river is fairly well contained within steeply sloping, natural and artificially created embankments. Poorly and very poorly drained soil types were historically formed within the man-made Powder Mill Pond. The Inland Wetland soil types remain, although the pond has been drained. A small, created-wetland was identified in a depressional area of the former sand and gravel pit to the south of the bridge. The limits of the Connecticut Inland Wetlands were delineated with consecutively numbered, orange survey tapes (Figures 2, 3 and 4). Short descriptions of the soil map units identified in the project area are presented in the soil report (Appendix I).

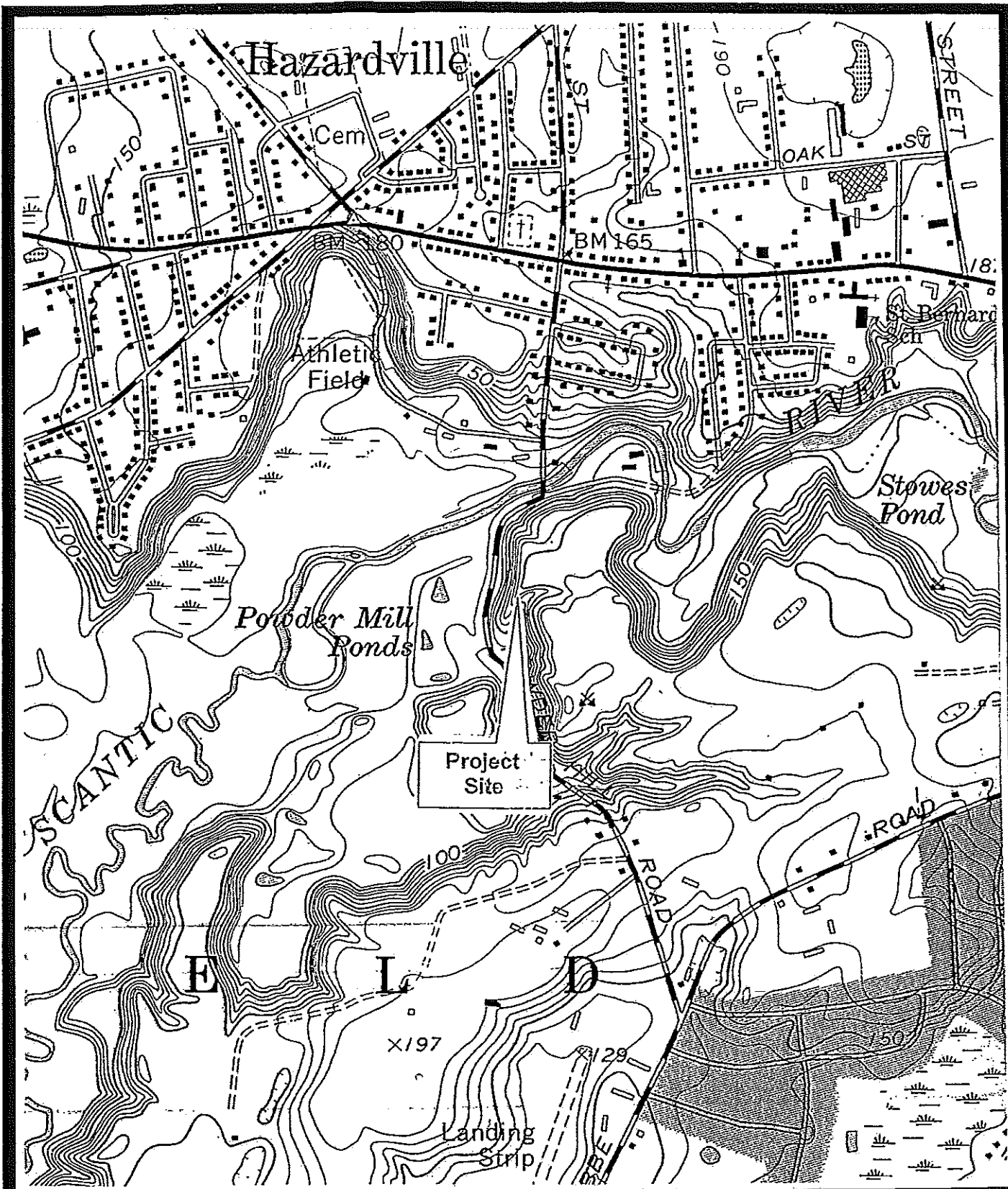
Three relatively small areas of Federal Wetlands were identified in the project area. They are located within the floodplain at the base of steep embankments to the east of the bridge and in a depressional area of an old gravel pit. The floodplain wetlands contain a mix of saplings, shrubs and herbaceous plants common to riparian wetlands. The man-made wetland in the old sand and gravel pit is dominated by a cattail-Phragmites marsh with an alder thicket along its edges. The limits of the Federal Wetland were delineated with blue survey tapes (Figure 5). Two data plot transects were established to document the vegetative, soil and hydrologic features along the Federal Wetland boundaries (Appendix II).

Respectfully submitted,

SOIL SCIENCE AND ENVIRONMENTAL SERVICES, INC.



Thomas W. Pietras  
Professional Wetland and Soil Scientist



Project Location Map for South Maple Street Bridge over  
Scantic River, Enfield, CT

FIG.

1

SCALE:  
1" = 1000'

SOIL SCIENCE AND ENVIRONMENTAL  
SERVICES, INC.

DATE:  
December 2002

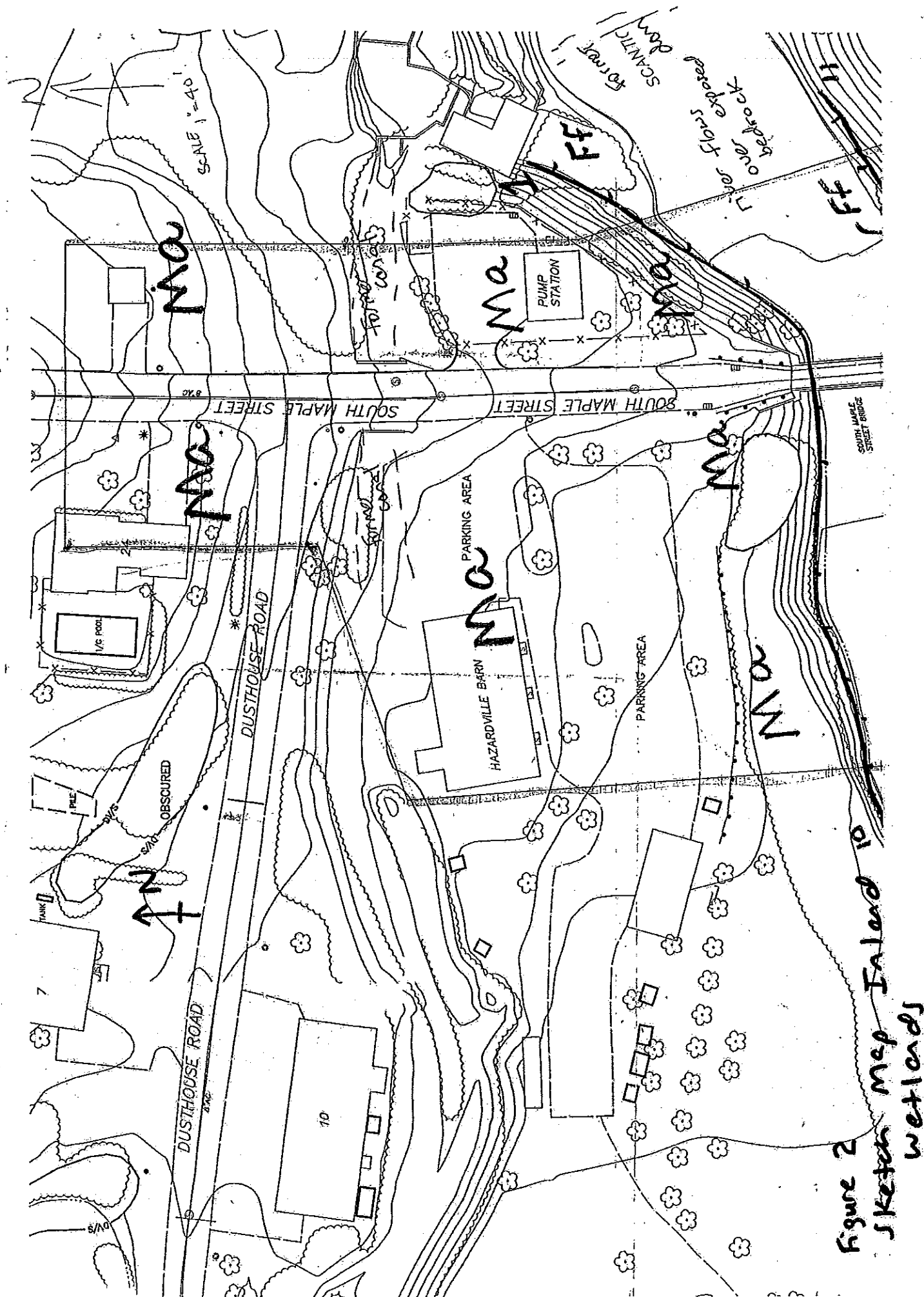


Figure 2  
Sketch Map Inland 10  
wetlands

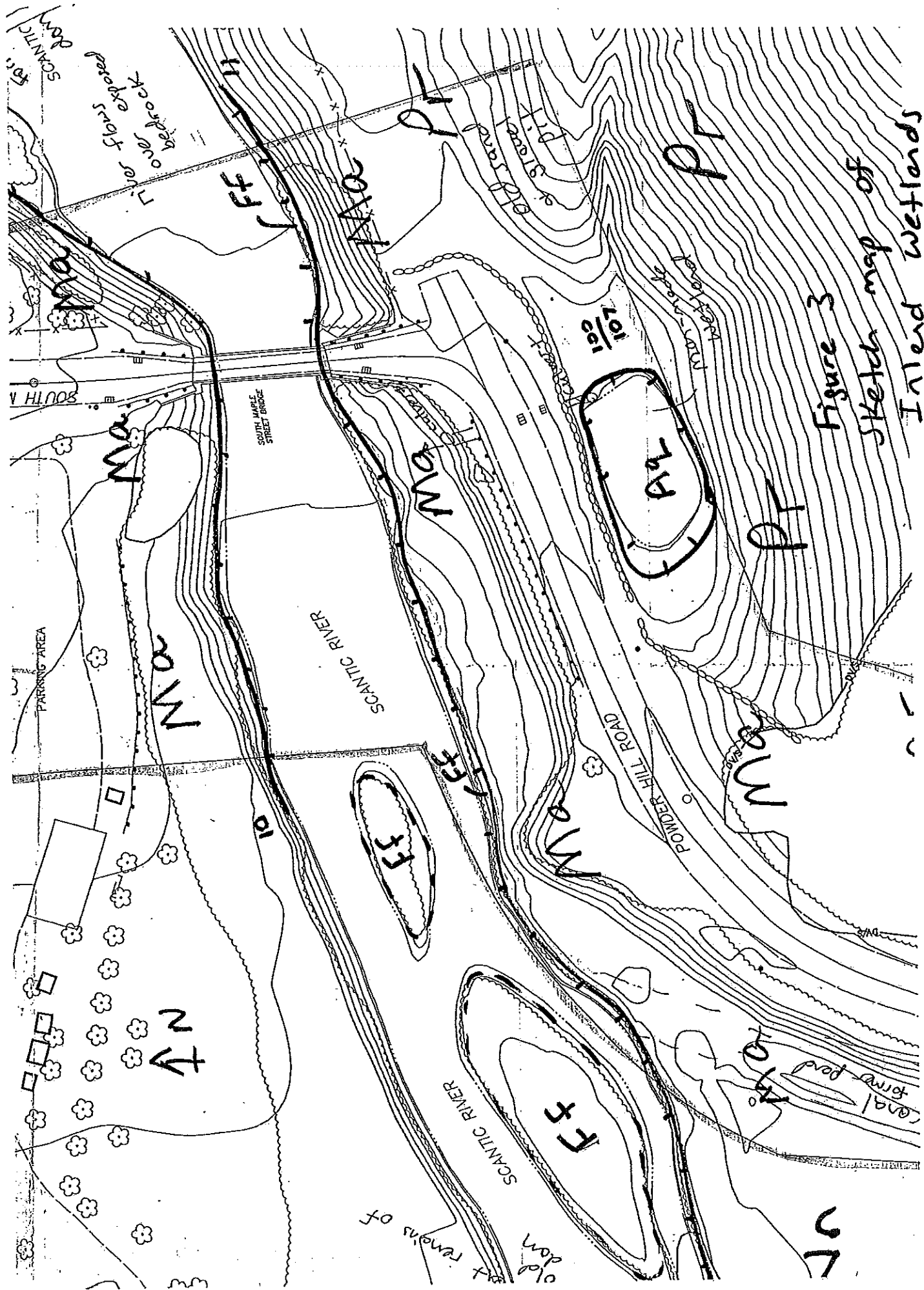
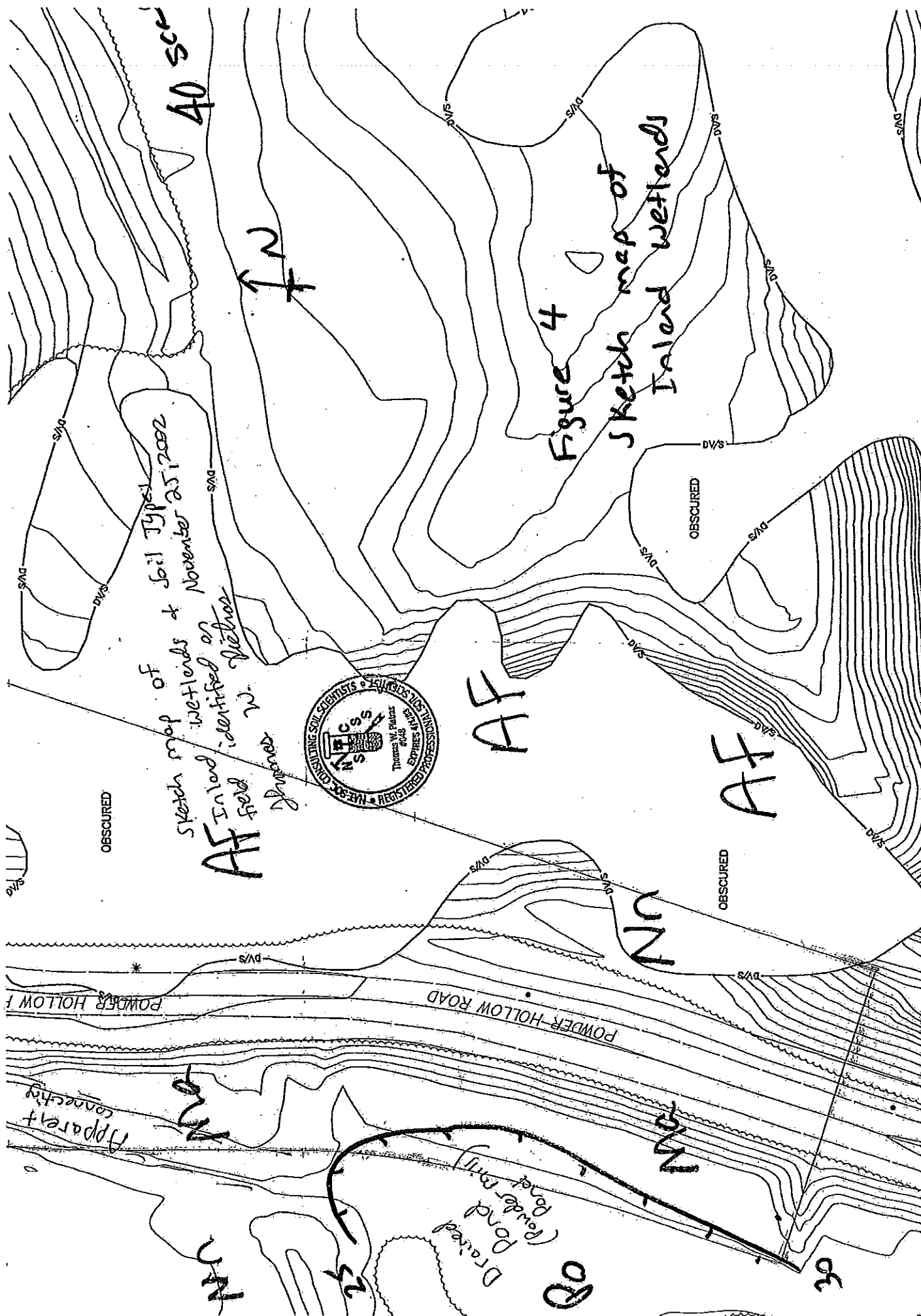


Figure 3  
Sketch map of  
Intend Wetlands





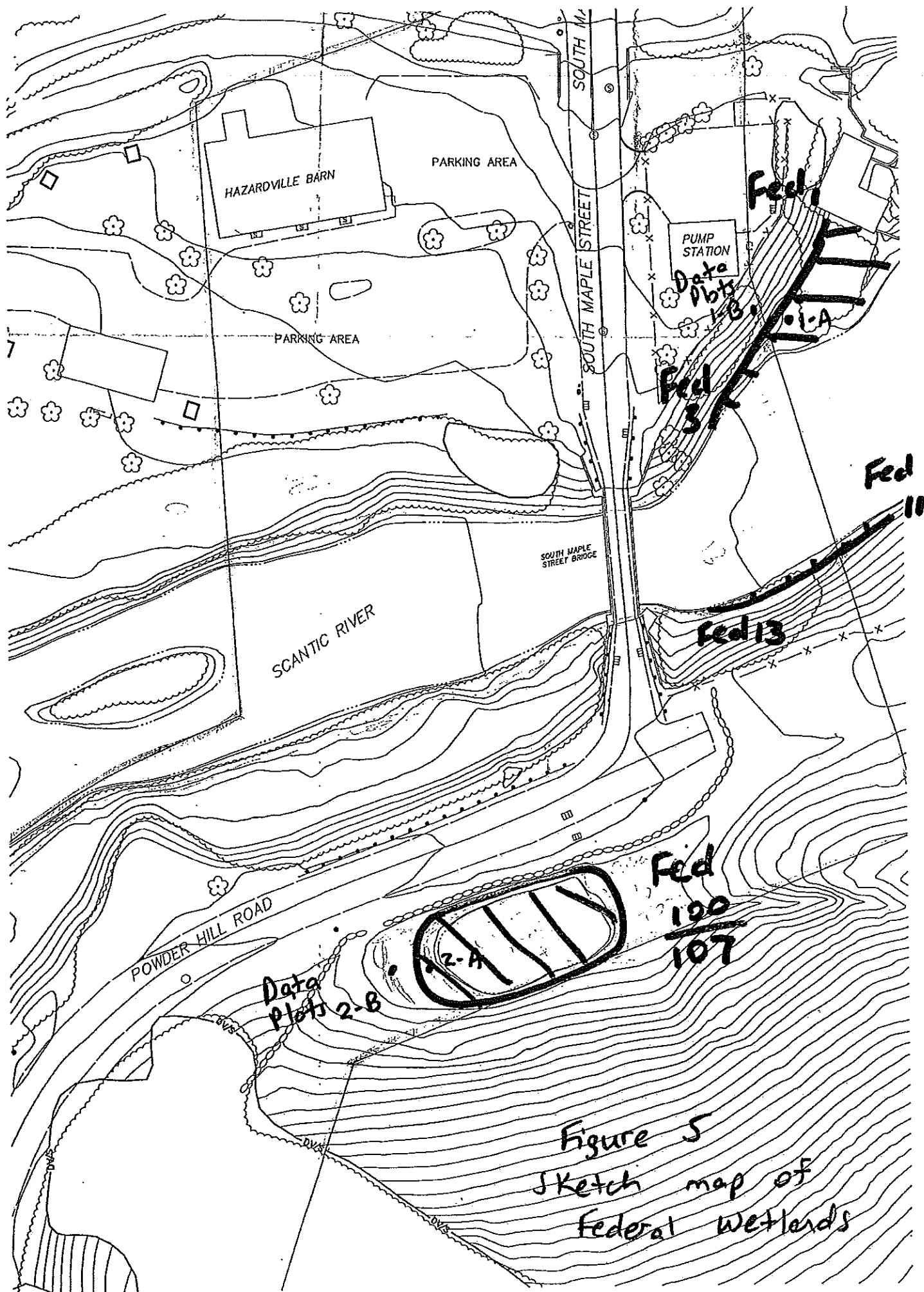


Figure 5  
Sketch map of  
Federal Wetlands

---

APPENDIX I

SOIL REPORT  
SOUTH MAPLE STREET BRIDGE  
OVER SCANTIC RIVER  
ENFIELD, CT

DECEMBER 2002

SOIL SCIENCE AND ENVIRONMENTAL SERVICES, INC.

# SOIL SCIENCE AND ENVIRONMENTAL SERVICES, INC.

545 Highland Avenue • Route 10 • Cheshire • Connecticut • 06410 • (203) 272-7837 • Fax (203) 272-6698

## SOIL REPORT

TO: Tectonic/Keys Associates  
1344 Silas Deane Highway  
Rocky Hill, CT 06067

SSS Job No. 2002-642-CT-ENF-3  
Client Job No. 2833.00  
Site Inspection Date November 25, 2002

PROJECT TITLE AND LOCATION South Maple Street Bridge Replacement over  
Scantic River, Enfield, CT

PROJECT DESCRIPTION: *Inland wetland identification and classification of soils*

### METHOD FOR IDENTIFICATION OF MAP UNITS

#### Wetlands

- ☒ Field marking (flagging) for survey.  
☒ Field plotting on Topographic Map, scale: 1"=40', contour: 2 ft.  
☐ Field plotting on aerial photography.

#### Non Wetland Soils

- ☒ High intensity field identification by Soil Scientist.  
☐ Medium intensity identification from USDA, Soil Conservation Service Soil Maps.

### METHOD OF SOIL IDENTIFICATION

- ☒ Spade and Auger  
☐ Deep test pits (backhoe)  
☐ Other \_\_\_\_\_

### SOIL MOISTURE CONDITION

☐ Dry ☒ Moist ☐ Wet

Frost Depth \_\_\_\_\_ in.

Snow Depth \_\_\_\_\_ in.

*The classification system of the National Cooperative Soil Survey, USDA, Soil Conservation Service and the County Identification Legend were used in this investigation. The investigation was conducted by the undersigned Certified Soil Scientist.*

*All wetland boundary lines established by the undersigned Soil Scientist are subject to change until officially adopted by local, state or federal regulatory agencies.*

Respectively submitted by

SOIL SCIENCE AND ENVIRONMENTAL SERVICES, INC.

Thomas W. Pietras

Soil Scientist

Field Investigator

Thomas W. Pietras

Approved by

Kenneth C. Stevens, Jr.

Kenneth C. Stevens, Jr.  
Principal Soil Scientist

See attached page(s)

## SOIL REPORT *continued*

South Maple Street Bridge Replacement over Scantic  
River, Enfield, CT

PROJECT TITLE: \_\_\_\_\_

### MAPS/PLANS TRANSMITTED TO CLIENT

- ☒ Sketch location of Wetlands and other Soil Types.  
☐ None

### NUMBERING SEQUENCE OF WETLAND BOUNDARY LINE MARKERS

1 THRU 10	11 THRU 24	25 THRU 30	100 THRU 107
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

### SUMMARY SOIL DESCRIPTIONS

#### WETLAND SOILS

Aquents (Aq). This is poorly to very poorly drained disturbed soil where two or more feet of the original soil surface has been filled over or excavated. Aquents are characterized by a seasonal to prolonged high groundwater table and either support or are capable of supporting wetland vegetation.

Fluvaquents-Udifuvents (Ff). This soil mapping unit consists of deep, well drained to very poorly drained, nearly level soils that formed in recent alluvial deposits. The soils are frequently flooded, which results in stream scouring, lateral erosion and shifting of soil from place to place. Soil characteristics, including texture, content of gravel and drainage class, are often highly variable within short distances.

Podunk sandy loam (Po). This is a moderately well drained, moderately coarse over coarse textured, friable over loose alluvial soil developed on floodplains. In 1979, the soil was reclassified in CT to the Pootatuck fine sandy loam.

#### NONWETLAND SOILS

Agawam fine sandy loam (Af). This is a well drained, moderately coarse over coarse textured, friable over loose glacial fluvial (outwash) soil.

Made land (Ma). This is a well to moderately well drained, disturbed soil that has had two feet or more of its original soil surface excavated or filled.

Ninigret fine sandy loam (Nn). This is a moderately well drained, moderately coarse over coarse textured, friable over loose glacial fluvial (outwash) soil.

Pits, gravel (Pr). This unit consists of areas that have been excavated for sand and gravel.

For further information about the soils, refer to Soil Survey of Hartford County, Connecticut.

APPENDIX II

FEDERAL WETLAND DATA FORMS

SOUTH MAPLE STREET BRIDGE

OVER SCANTIC RIVER

ENFIELD, CT

DECEMBER 2002

SOIL SCIENCE AND ENVIRONMENTAL SERVICES, INC.

**SOIL** Sketch landscape position of this plot. Indicate relative position of other plot(s) and the wetland flag if not on plan.

Scout's  
River

1-A <sup>red</sup> WL flag

1-B

Submission of photo of plot is encouraged.

← 5' → ← 10' →

DEPTH	HORIZON	MATRIX COLOR	REDOXIMORPHIC FEATURES (color, abundance, size, contrast)	COMMENTS (USDA texture, nodules, concretions, masses, pore linings, restrictive layers, root distribution, soil water, etc.)
0-6	A <sub>1</sub>	7.5YR 2/2		very fine sandy loam (alluvial material)
6-10	A <sub>2</sub>	7.5YR 4/2		silt loam (alluvial material)
10-14+	C	7.5YR 4/3		stony loamy fine sand  (mix of disturbed soil + alluvial material)
Note: Plot is located in excavated riverbank area of historic mill site				

HYDRIC SOIL INDICATOR(S): IV Problem b1 REFERENCE(S): Field Indicators for  
Hydric Floodplain disturbed soil Identifying Hydric Soils  
in New England (1998)

**OPTIONAL SOIL DATA**

Taxonomic subgroup: Fluvaquents  
Soil drainage class: poorly drained  
Depth to active water table:  
NTCHS hydric soil criterion:   

REFERENCE(S):  
Soil Taxonomy

**CONCLUSIONS**

	YES	NO	REMARKS:
Hydrophytic vegetation criterion met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Hydric soils criterion met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Wetland hydrology criterion met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
IS THIS DATAPOINT IN A WETLAND?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

CENAE-CO-R-PT Version 7/1/00 Page 2

PROJECT TITLE: S. Maple St. Bridge  
Enfield, CT

TRANSECT: 1

PLOT: A

**SOIL** Sketch landscape position of this plot. Indicate relative position of other plot(s) and the wetland flag if not on plan.

see data plot 1 - A

Submission of photo of plot is encouraged.

DEPTH	HORIZON	MATRIX COLOR	REDOXIMORPHIC FEATURES (color, abundance, size, contrast)	COMMENTS (USDA texture, nodules, concretions, masses, pore linings, restrictive layers, root distribution, soil water, etc.)
0-15"	C			mix of stones + loamy soil
			very steeply sloping stone rip-rapped embankment	

HYDRIC SOIL INDICATOR(S):

REFERENCE(S):

**OPTIONAL SOIL DATA**

REFERENCE(S):

Taxonomic subgroup: Udorthents

Soil drainage class: moderately well to well

Depth to active water table:

NTCHS hydric soil criterion:

Soil Taxonomy

**CONCLUSIONS**

	YES	NO	REMARKS:
Hydrophytic vegetation criterion met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Hydric soils criterion met?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Wetland hydrology criterion met?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
IS THIS DATAPOINT IN A WETLAND?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

CENAE-COR-PT Version 7/1/00 Page 2

PROJECT TITLE: S. maple St Bridge  
Enfield, CT

TRANSECT: 1

PLOT: B



**SOIL** Sketch landscape position of this plot. Indicate relative position of other plot(s) and the wetland flag if not on plan.

cattail  
phragmites  
marsh

Submission of photo of plot is encouraged.

7' 10' 2-B  
2-A  
Fed WL flag 101

DEPTH	HORIZON	MATRIX COLOR	REDOXIMORPHIC FEATURES (color, abundance, size, contrast)	COMMENTS (USDA texture, nodules, concretions, masses, pore linings, restrictive layers, root distribution, soil water, etc.)
0-1"	A	7.5YR 2/2		silt loam
1-12"	C <sub>1</sub>	5YR 4/3	C <sub>1</sub> d	silt loam
12-17	C <sub>2</sub>	5YR 4/4	5YR 4/6 C <sub>1</sub> d 5YR 4/6	oxidized rhizosphere loamy very fine sand
17-24	C <sub>3</sub>	5YR 4/3		silty, very fine sand firm
former excavation within old gravel pit with fine textured soil layers & seasonal high water table				

HYDRIC SOIL INDICATOR(S): IV Problem Area REFERENCE(S): Field Indicators for  
disturbed soil in Identifying Hydric Soils  
reddish parent material in New England (1998)

**OPTIONAL SOIL DATA**

Taxonomic subgroup: Aquepts REFERENCE(S):  
Soil drainage class: poorly drained Soil Taxonomy  
Depth to active water table:  
NTCHS hydric soil criterion: TF2 U.S. Field Indicators of Hydric Soils (1998)

**CONCLUSIONS**

	YES	NO	REMARKS:
Hydrophytic vegetation criterion met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Hydric soils criterion met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Wetland hydrology criterion met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
IS THIS DATAPPOINT IN A WETLAND?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

CENAE-COR-PT Version 7/1/00 Page 2

PROJECT TITLE: S. maple St Bridge  
Enfield, CT

TRANSECT: 2 PLOT: A

SOIL Sketch landscape position of this plot. Indicate relative position of other plot(s) and the wetland flag if not on plan.

see data plot 2-A

Submission of photo of plot is encouraged.

DEPTH	HORIZON	MATRIX COLOR	REDOXIMORPHIC FEATURES (color, abundance, size, contrast)	COMMENTS (USDA texture, nodules, concretions, masses, pore linings, restrictive layers, root distribution, soil water, etc.)
0-1"	A	7.5YR 2/2		silt loam
1-13	C <sub>1</sub>	5YR 4/4		loamy very fine sand
13-17	C <sub>2</sub>	5YR 4/4	C <sub>1d</sub> 7.5YR 4/6	silty, very fine sand
17-26	C <sub>3</sub>	5YR 4/3		silty, very fine sand

HYDRIC SOIL INDICATOR(S):

REFERENCE(S):

#### OPTIONAL SOIL DATA

Taxonomic subgroup: Udotherts  
Soil drainage class: moderately well  
Depth to active water table:  
NTCHS hydric soil criterion:

REFERENCE(S):  
Soil Taxonomy  
Draft US Army Corps Soil Drainage  
Classes for New England

#### CONCLUSIONS

	YES	NO	REMARKS:
Hydrophytic vegetation criterion met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Hydric soils criterion met?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Wetland hydrology criterion met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
IS THIS DATAPOINT IN A WETLAND?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

CENAE-COR-PT Version 7/1/00 Page 2

PROJECT TITLE: J map at Bridge  
Enfield, CT

TRANSECT: 2

PLOT: B

PROJECT TITLE: South Maple Street Bridge  
over Scantic River, Enfield, CT

TRANSECT: 1

PLOT: A

DELINEATOR(S): Thomas W. Pietras, S&S, Inc

DATE: November 25, 2002

# VEGETATION

Stratum and Species

Dominance  
Ratio

Percent  
Dominance

D  
O  
M

NWI Status

## Seedlings + herbs

Poa palustris

10.5/27

39%

+

FACW

Aster sp.

10.5/27

39

-

-

Cinna latifolia

3/27

11

+

FACW

Secale cereale

3/27

11

+

NI

## shrubs

Alnus rugosa

20.5/31

66%

+

FACW+

Cornus amomum

10.5/31

34

+

FACW

## saplings

Alnus rugosa

38/47

80%

+

FACW+

Acer rubrum

3/47

6

+

FAC

Platanus occidentalis

3/47

6

+

FACW-

Carpinus caroliniana

3/47

6

+

FAC

## trees

Catalpa speciosa

63/508

12%

+

FAC

Salix nigra

246/508

48

+

FACW+

Populus deltoides

160/508

31

+

FAC

Fraxinus americana

39/508

7

+

FACW

## vines

# HYDROPHYTES

0

5

1

0

OBL

FACW

FAC

\*OTHER

Hydrophytes Subtotal (A): 6

# NON-HYDROPHYTES

0

0

0

FAC-

FACU

UPL

Non-hydrophytes Subtotal (B): 0

PERCENT HYDROPHYTES (100A/A+B): 100%

# HYDROLOGY

## RECORDED DATA

Stream, lake, or tidal gage

Identification:

Aerial photography

Identification:

Other

Identification:

## NO RECORDED DATA

## OBSERVATIONS:

Depth to Free Water:

3 inches

Depth to Saturation (including capillary fringe):

0

Altered Hydrology (explain):

☐ Inundated

☒ Saturated in  
upper 12"

☐ Water Marks

☐ Drift Lines

☒ Sediment  
Deposits

☒ Drainage  
Patterns  
within Wetland

☐ OTHER (explain):

PROJECT TITLE: South Maple Street Bridge  
over Scotic River, Enfield, CT  
DELINEATOR(S): Thomas W. Pietras, SS+ES, Inc.

TRANSECT: 1

PLOT: B

DATE:

November 25, 2002

# VEGETATION

Stratum and Species

Dominance  
Ratio

Percent  
Dominance

D  
O  
M

NWI Status

herbs + seedlings

Toxicodendron radicans

20.5/52

39%

+ FAC

field grasses

10.5/52

20

+ FACW

Cornus amomum

10.5/52

20

NF

Ailanthus altissima

10.5/52

20

shrubs

Alnus rugosa

10.5/27

39%

+ FACW+

Cornus amomum

10.5/27

39

FACW

Acer saccharum

3/27

11

FACU-

Ulmus americana

3/27

11

FACW-

saplings

Alnus rugosa

20.5/20.5

100%

+ FACW+

trees

Populus deltoides

633/735

86%

+ FAC

Catalpa speciosa

63/735

9

FAC

Fraxinus americana

39/735

5

FACU

vines

## HYDROPHYTES

0

4

2

0

OBL

FACW

FAC

\*OTHER

Hydrophytes Subtotal (A): 6

## NON-HYDROPHYTES

0

0

0

FAC-

FACU

UPL

Non-hydrophytes Subtotal (B): 0

PERCENT HYDROPHYTES (100A/A+B): 100%

## HYDROLOGY



RECORDED DATA

Stream, lake, or tidal gage

Aerial photography

Other

Identification:

Identification:

Identification:



NO RECORDED DATA



OBSERVATIONS:

Depth to Free Water:

none

Depth to Saturation (including capillary fringe):

none

Altered Hydrology (explain):



Inundated



Saturated in  
upper 12"



Water Marks



Drift Lines



Sediment  
Deposits



Drainage  
Patterns  
within Wetland



OTHER (explain):

PROJECT TITLE: South Maple Street Bridge TRANSECT: 2 PLOT: A  
 over Scantic River, Enfield, CT  
 DELINEATOR(S): Thomas W. Pietras, SS+ES, Inc. DATE: November 25, 2002

VEGETATION	Stratum and Species	Dominance Ratio	Percent Dominance	DOM	NWI Status
<u>herbs + seedlings</u>					
	Phragmites australis	63/73.5	86%	+	FACW
	Alnw rugosa	10.5/73.5	14		FACW+
<u>shrubs</u>					
	Alnw rugosa	20.5/20.5	100%	+	FACW+
<u>saplings</u>					
	Alnw rugosa	38/44	86%	+	FACW+
	Salix discolor	3/44	7		FACW
	Betula populifolia	3/44	7		FAC
<u>trees</u>					
	Salix discolor	58/58	100%	+	FACW
<u>vines</u>	/				

HYDROPHYTES  
0 4 0 0  
 OBL FACW FAC \*OTHER  
 Hydrophytes Subtotal (A): 4

NON-HYDROPHYTES  
0 0 0  
 FAC- FACU UPL  
 Non-hydrophytes Subtotal (B): 0

PERCENT HYDROPHYTES (100A/A+B): 100%

## HYDROLOGY

### ☐ RECORDED DATA

Stream, lake, or tidal gage

Aerial photography

Other

Identification: \_\_\_\_\_

Identification: \_\_\_\_\_

Identification: \_\_\_\_\_

### ☒ NO RECORDED DATA

### ☒ OBSERVATIONS:

Depth to Free Water: 2 inches

Depth to Saturation (including capillary fringe): 0

Altered Hydrology (explain): \_\_\_\_\_

☐ Inundated

☒ Saturated in upper 12"

☐ Water Marks

☐ Drift Lines

☐ Sediment Deposits

☒ Drainage Patterns within Wetland

☐ OTHER (explain): \_\_\_\_\_

PROJECT TITLE: South Maple Street Bridge TRANSECT: 2 PLOT: B  
over Scantic River, Enfield, CT  
 DELINEATOR(S): Thomas W. Pietras, SS+ES, Inc. DATE: November 25, 2002

VEGETATION	Stratum and Species	Dominance Ratio	Percent Dominance	DOM	NWI Status
<u>herbs + seedlings</u>					
	<i>Phragmites australis</i>	10.5/30	35%	+	FACW
	<i>Alnus rugosa</i>	10.5/30	35	+	FACW+
	<i>Acer rubrum</i>	3/30	10		FAC
	<i>Pinus strobus</i>	3/30	10		FACU
	<i>Elaeagnus angustifolia</i>	3/30	10		FACU
<u>shrubs</u>					
	<i>Alnus rugosa</i>	63/63	100%	+	FACW+
<u>saplings</u>					
	<i>Alnus rugosa</i>	63/73.5	86%	+	FACW+
	<i>Betula populifolia</i>	10.5/73.5	14		FAC
<u>trees</u>					
	<i>Salix discolor</i>	58/137	42%	+	FACW
	<i>Populus tremula</i>	79/137	58	+	FACU
<u>vines</u> /					

HYDROPHYTES  
0 5 0 0  
 OBL FACW FAC \*OTHER

Hydrophytes Subtotal (A): 5

NON-HYDROPHYTES  
0 1 0  
 FAC- FACU UPL

Non-hydrophytes Subtotal (B): 1

PERCENT HYDROPHYTES (100A/A+B): 83%

## HYDROLOGY

- ☐ RECORDED DATA  
 Stream, lake, or tidal gage  
 Aerial photography  
 Other

Identification: \_\_\_\_\_  
 Identification: \_\_\_\_\_  
 Identification: \_\_\_\_\_

- ☒ NO RECORDED DATA

- ☒ OBSERVATIONS:

Depth to Free Water: 17 inches  
 Depth to Saturation (including capillary fringe): 12 inches  
 Altered Hydrology (explain): \_\_\_\_\_

- ☐ Inundated ☒ Saturated in upper 12" ☐ Water Marks ☐ Drift Lines ☐ Sediment Deposits ☐ Drainage Patterns within Wetland

☐ OTHER (explain):

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## INLAND WETLANDS AND WATERCOURSES AGENCY

Certified Mail: XXXXXXXXXXXXXXXX

### WETLANDS PERMIT #XIW -10-04

April 21, 2010

Town of Enfield – Public Works  
40 Moody Road  
Enfield, CT 06082

Town of Enfield,

At a regular meeting held April 20, 2010, the Enfield Inland Wetlands and Watercourses Agency took the following action:

**XIW-10-04 – Town of Enfield Public Works – is requesting a permit to reconstruct and enlarge the South Maple Street Bridge over the Scantic River (Map 84, Lots 7, 12, 14 and 21). Approved with conditions.**

The permit is issued subject to the following conditions:

#### **STANDARD CONDITIONS**

##### **Prior to the start of construction:**

1. The Inland Wetlands and Watercourses Agency or its designated Agent must be notified in writing within two business days of the commencement of permitted activities, and upon completion of said activities; a "business day" is a day when the Town Hall is open for business.
2. Prior to the start of construction or, if applicable, the issuance of a building permit the half-sized (approximately 11" x 17") plans as approved by the Agency and the Planning and Zoning Commission shall be submitted to the Inland Wetlands Agent;
3. If the project requires that materials be removed from the site, the Inland Wetlands and Watercourses Agency or its designated Agent must be notified in writing within two business days of the commencement of permitted activities of where the removed materials will be deposited.
4. The permittee/contractor shall schedule a pre-construction meeting with the Inland Wetlands Agent to be held no sooner than two weeks before the regulated activities are to begin. The permittee shall, at that time, review with the Inland Wetlands Agent, the procedures to be taken to protect the regulated areas prior to and during construction;

##### **General Conditions of Approval:**

5. This permit shall be valid for 5 years from the date of approval unless otherwise revoked or specifically extended;
6. All work and all regulated activities conducted pursuant to this permit shall be consistent with these terms and conditions hereof. Any structures, excavation, fill, obstruction, encroachments or regulated activities

not specifically identified and authorized herein shall constitute a violation of this permit and may result in its modification, suspension, or revocation. Upon initiation of the activities authorized herein, the permittee thereby accepts and agrees to comply with the terms and conditions hereof;

7. This permit is not transferable without the written consent of the Enfield Inland Wetlands and Watercourses Agency or its designated Agent;
8. In issuing this permit, the Agency has relied on information provided by the applicant and, if such information subsequently proves to be false, deceptive, incomplete and/or inaccurate this permit shall be modified, suspended or revoked;
9. This permit shall be made a part of all construction contracts and sub-contracts pertaining to the proposed regulated activities and shall supersede all other contract requirements;
10. The permittee shall permit the Agency, its authorized representative(s) or designee(s) to make periodic inspections at any time deemed necessary in order to assure that the activity being performed under authority of this permit is in accordance with the terms and conditions prescribed herein;
11. No equipment or material including without limitation, fill, construction materials, or debris, shall be deposited, placed, or stored in any wetland or watercourse on or off site unless specifically authorized by this permit;
12. This permit is subject to and does not derogate any present or future property rights or other rights or powers of the Town of Enfield, and conveys no property rights or in real estate of material nor any exclusive privileges, and is further subject to any and all public and private rights and to any activity affected hereby;
13. Prior to the start of construction, adequate erosion and sedimentation control measures shall be implemented, and shall be maintained throughout the entire construction phase and shall meet or exceed the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, as revised, until the site has become stabilized with permanent vegetative cover. The construction site shall be left in a stable condition at the close of each day. An adequate stockpile of erosion control materials shall be on site at all times for emergency or routine replacement and shall include materials to repair silt fences, haybales, mulch, stone-riprap filter dikes or any other devices planned for use during construction. Additional erosion/stormwater control measures are to be installed as directed by the Inland Wetland Agency, its authorized representative(s) or designee(s) if field conditions necessitate. The permittee shall immediately inform the Department of Planning and Community Development of any problems involving wetlands or watercourses which have developed in the course of, or which are caused by, the authorized work;
14. All temporary barriers, including erosion and sedimentation controls are to be removed when the site is stabilized in suitable weather conditions. The site is considered stabilized when there is equal to or greater than 70% vegetative cover;
15. With the exception of the addition of the items stated in these conditions, this application is approved in accordance with the plans entitled:

"Town of Enfield Construction Plans for Replacement of Bridge No. 03972 South Maple Street Over Scantic River from Sta. 10+50.00 to Sta. 15+60.71 Length 510.71 Feet, prepared by Tectonic Engineering & Surveying Consultants P.C., dated 4/9/10, received 4/13/10.



List of Drawings	
Sheet No.	Title
1	Title Sheet
2-3	Detailed Estimate Sheet
4	Typical Sections
5	Miscellaneous Details
6	Roadway Plan
7	Profile
8	Signing and Pavement Marking Plan
9	Detour Plan
10-13	Roadway Cross Sections
14	General Plan No. 1
15	General Plan No. 2
16-18	Boring Logs
19-22	Abutments & Wingwalls
23	Substructure Details
24	Framing Plan
25-27	Beam Details
28	Beam Rail Attachment
29-30	Metal Bridge Rail Details
31	Water Handling Plan
A-1	Utility Plan (CL&P)
	Highway Guide Sheets
	Highway Standard Sheets
	Traffic Engineering Guide Sheets
	Traffic Engineering Standard Sheets

Any changes that would potentially cause greater impact to wetlands or watercourses, such as enlargement of the area of disturbance or reorientation of building footprints, from the plans shall require the permittee to come before the Enfield Inland Wetlands and Watercourses Agency for a Determination of Permit Need (Jurisdictional Ruling) or Permit Modification.

16. A copy of the As-Built plan with the topography certified to T2 accuracy shall be submitted to the Agency or its designated Agent upon completion of the project to ensure compliance with this approval. In addition an electronic copy of the As-Built plan shall be submitted in accordance with the "Town of Enfield, CT Geographic Information Systems Electronic Submittals Ordinance".
17. The Inland Wetlands and Watercourses Permit number shall be located on all future plans to any Town or State Agency.

**Special Conditions of Approval:**

18. The proposed catch basins and their associated outfalls must be constructed and stabilized prior to any dewatering activities occurring.
19. All water to be discharged from the construction activities must be discharged free of chemicals and sediment to an upland area that is armored so that erosion does not occur.
20. The following shall be included in the permit specifications for the contractor's knowledge.

### **NOTICE TO CONTRACTOR – PERMITS/PERMIT APPLICATION**

The Contractor is hereby notified that all permit and permit applications contained herein and required shall be made part of this Contract, and that the Contractor shall be bound to comply with all requirements of such permits and permit applications as though the Contractor were the permittee. If at the time the permit is received its contents differ from that which is outlined in the application, the permit shall govern. Should the permit be received after the receipt of bids and the permit requirements significantly change the character of the work, adjustments will be made to the contract in accordance with the appropriate articles in Section 1.04. The requirements and conditions set forth in the permit application shall be binding on the Contractor just as any other specifications would be. Contractor to abide by construction staging plans and water handling information provided. Any proposed changes must be approved by Controlling Authority.

The following permits are required or may be required for this project:

- Town of Enfield Inlands Wetlands
- Flood Management Certificate
- Army Corps Certification
- General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities
- Town of Enfield Aquifer Protection Area Permit
- Town of Enfield Building Permit
- Oversize/Overweight Vehicle Permits
- This list is for information purposes only as other permits may be necessary.

### **NOTICE TO CONTRACTOR – CONSTRUCTION SEQUENCE**

The Contractor is hereby notified that the protection of the environment is paramount to the success of this project. The contractor shall adhere to the following sequencing unless specifically authorized by the Engineer:

1. The Contractor shall attend the preconstruction meeting as directed by the Engineer.
2. Prior to any tree cutting, the Contractor shall schedule and attend a tree cutting meeting with Town Staff and the Engineer and Design Engineer. Prior to this meeting the Contractor shall mark each tree to be removed or trimmed. In addition, the slope limits shall be identified. The meeting shall be held at the project site.
3. Install sedimentation control fencing and at the slope limits as shown on the plans or as directed by the Engineer. Install other controls as necessary.
4. Establish staging areas and protective fences as approved and directed.
5. Clear and Grub the site. Dispose of stumps and debris in accordance with applicable regulations. Strip and stockpile topsoil from all disturbed areas for future reuse.
6. Install the drainage outlet preformed scour hole as shown on the plans for later use during dewatering activities.
7. Install debris containment measures to prevent bridge demolition materials from falling into the River and wetland areas. The debris containment measures shall be designed by the Contractor based on his demolition methods. The proposed containment measures shall be approved by the Engineer. The Engineer may require modifications, repairs and/or additional measures.
8. Remove existing bridge superstructure.
9. Install turbidity curtains as shown on the plans.

10. Construct temporary sedimentation basins and/or other water handling features. These features shall be designed and located to accommodate the Contractor operations and activities.
11. Install Cofferdams and temporary shoring as needed to isolate the work areas and protect the excavation.
12. Remove existing abutments and wingwalls then perform excavation to the line and grade shown on the plans. Natural streambed material shall be stockpiled as directed for reuse.
13. Construct the footings in the dry.
14. Construct the abutments and wingwalls then backfill as needed, including the placement of riprap and streambed materials. Grade and stabilize slopes per plan or as directed by the Engineer.
15. Remove cofferdams then turbidity curtains.
16. Install bridge superstructure, approach slab and finish roadway and drainage.
17. Place topsoil and establish grass and install plantings.
18. Inspect and clean drainage system and outlets.
19. Remove temporary sedimentation control fences and other measures once all disturbed areas are stabilized.

The Contractor shall maintain and adjust the temporary controls to ensure proper performance to protect the environment. The sediment controls shall be carefully inspected prior to any storm event. For large events, periodic inspection during the event may be required as directed by the Engineer. The Contractor shall repair, modify or supplement the systems as necessary and directed.

#### **NOTICE TO CONTRACTOR – STAGING AREAS**

The Contractor is hereby notified that areas available for staging, storage and stockpiling of materials, tools and equipment are limited. For the purposes of this specification "Staging Area" shall include any area used to store materials, stockpiling and equipment for longer than 3 calendar days. The Contractor shall adhere to the following in utilizing the available areas:

1. No staging areas shall be permitted within the limits of the floodplain as identified on Flood Insurance Rate Mapping of the Town.
2. Stockpiles of earth materials shall be temporarily stabilized and contained within sedimentation control fence or covered to prevent erosion and sediment transport from rain and surface flow.
3. No staging areas shall be within any wetland limits.
4. Concrete washout shall not occur within 50 feet of a regulated area or within the 200 foot buffer area without written approval from the Engineer. Generally, concrete washout shall be positively controlled and contained to prevent contamination from entering any regulated area.
5. The worksite shall be kept clean at all times to prevent litter and other debris from entering the regulated wetlands and floodplain areas. At least two trash receptacles shall be provided and periodically emptied.
6. Pedestrian access to the adjacent park shall be provided at all times unless specifically authorized by the Town in writing. At a minimum a smooth 4 foot wide path shall be provided from Powder Hill Road with appropriate way finding signs installed. The path shall be physically separated from the contractors operations and staging area with a temporary fence.
7. Access to private properties shall be maintained unless authorized in writing.
8. The project is located within an Aquifer Protection Area subject to Level "A" Mapping regulations. The contractor shall adhere to the "Aquifer Protection Area Regulations of the Town of Enfield". The Contract may be required to register, provide Registration Fee(s) and post a Bond as part of this requirement.
9. Any Staging Area used shall be returned to the original condition unless specifically directed or authorized in writing.

10. The Contractor shall have a Spill Kit available on site for immediate use. The Spill Kit shall contain the following minimum items:
  - NS® Spill Control, 55 Gallon Universal Sorbent Wheeled Overpack Spill Kit, 50 Gal. Capacity or approved Equal
  - (10)–3" x 48" socks
  - (4)–3" x 10' socks
  - (50)–15" x 17" pads
  - (4)–pillows
  - (50)–wipers
  - (5)–disposal bags and ties
  - (5)–tamperproof seals
  - (2)–pair nitrile gloves
  - (1)–emergency response guidebook
11. The Contractor shall conform to the 2002 CT E&S Guidelines or as directed by the engineer.

The cost of adhering to these requirements shall not be measured for payment but shall be included in the general cost of the project.

**NOTE:** This permit does not relieve the applicant from his responsibility to apply for any other permits required by local, state or federal agencies.

This authorization constitutes the permit required by Section 22a-39 of the Connecticut General Statutes. The decision legal notice will be published in the Journal Inquirer on **XXXXXXXXXXXX, 2010**. Please note that the appeal period (15 days) begins as of the date of publication in accordance with Sec. 22a-43 of the State Statutes.

Issuance of the Inland Wetlands and Watercourses Agency permit does not abrogate the responsibility to obtain permits that may be necessary from other agencies at the local, state or federal level prior to commencing your project.

Should you have any questions regarding the contents of this letter, please feel free to contact me at 253-6358.

Sincerely,

Katie A. Bednaz  
Assistant Town Planner/Wetlands Agent

cc. José Giner, Director of Planning  
XIW#10-04 File

## **CORRESPONDENCE**

# Use for Vernal Pool Construction Guidance

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## Conserving pool-breeding amphibians in human-dominated landscapes through local implementation of Best Development Practices

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### Abstract

Seasonal forest pools in the northeastern USA are unique ecosystems whose functions are intimately associated with adjacent upland habitats. This connection, coupled with their small size and ephemeral surface water, has made conservation of pool resources challenging. Seasonal pools provide optimal breeding habitat for animals adapted to temporary waters including ambystomatid salamanders (*Ambystoma* spp.), wood frogs (*Rana sylvatica* LeConte), and some invertebrates and plants. To date, wetland conservation efforts have been primarily limited to 2 pathways: land use regulation and preservation. Although both of these pathways have the potential to conserve some pool resources, they are often insufficient to maintain an array of pools in the landscape that support local population dynamics of amphibians. We propose a third pathway – local land-use planning – that can complement regulatory and preservation efforts. This suite of strategies, embodied in our Best Development Practices (BDPs), recognizes that not all pools will be conserved; local governances will need to develop priorities for conservation. The BDPs encourage local governances to (1) proactively identify their pool resources, (2) rank those pools according to their relative ecological value, and (3) establish management procedures and apply recommended guidelines in accordance with the relative rankings. We recommend that pools be ranked using biological criteria (e.g., presence of listed species, presence of breeding species, and egg mass abundance) and on the availability and quality of adjacent terrestrial habitat. We recommend 3 management zones: the pool depression, the pool envelope (i.e., land within 30 m of the pool), and the critical terrestrial habitat (i.e., 30–230 m from the pool). Residential, industrial, and commercial development, which may compromise pool habitat (e.g., through building and road construction, site clearing, stormwater management, and lighting), should follow the recommended guidelines presented in Appendix 1 of this paper. Planning at the watershed level, using such tools as overlay zones, wetland ordinances, and easements, should lead to more effective, long-term management of, at a minimum, the most ecologically important seasonal forest pool resources and will provide developers with clear development guidelines. This process is already being successfully implemented in a number of New England towns.

## Introduction

Seasonal forest pools, also called vernal pools, woodland vernal pools, ephemeral wetlands, or temporary wetlands, are unique ecosystems that perform important functions, but conservation of pool resources has proven to be challenging (Semlitsch 1998; Klemens 2000; Snodgrass et al. 2000; Marsh and Trenham 2001; Calhoun et al. 2003). Interest in seasonal forest pools has increased dramatically in the eastern USA in the last decade because of the well-publicized declines of amphibians (Alford and Richards 1999; Carey et al. 1999; Young et al. 2001), many of which depend on seasonal forest pools or other isolated wetlands for breeding (Pechmann et al. 1991; Lannoo 1998). To date, wetland conservation efforts have been limited to two pathways: land use regulation and preservation. Although both of these pathways have the potential to conserve some pool resources, they usually don't include mechanisms to maintain adjacent terrestrial habitat and connections among pools in an otherwise fragmented landscape. In this paper, we propose a third pathway – local land-use planning – to complement regulatory and preservation efforts through voluntary approaches.

Seasonal pools; other small, isolated wetlands; and the adjacent terrestrial habitat required by wetland-dependent animals have received little or no protection by wetland regulatory authorities at either federal or state levels (Fretwell et al. 1996; Preisser et al. 2000; Snodgrass et al. 2000). In a recent U.S. Supreme Court decision ([January 9, 2001], *Solid Waste Agency of Northern Cook County [SWANCC] v. United States Army Corps of Engineers [Corps]*), the Court held that the Corps had no jurisdiction over isolated waters based solely upon the use of the waters by migratory birds (i.e., 'Migratory Bird Rule'), and that Congress did not intend Section 404 of the Clean Water Act to include Corps regulation of such isolated waters. The extent to which this ruling will affect protection of seasonal pools and other isolated wetlands in the northeastern U.S. remains to be seen, but already it has sent the message to states and other jurisdictions that conservation of isolated wetlands is not a priority.

States in the northeastern USA have wetland protection statutes that regulate human activities in jurisdictional wetlands at a level equal to, or

more stringent than, federal regulations. Specific regulatory programs and permit processes vary from state to state (Preisser et al. 2000), but small wetlands, including seasonal forest pools, receive the least protection under most state regulatory programs. Some states (e.g., Rhode Island, Maine, Massachusetts) have special language for pool protection, but in all cases, protection of adjacent terrestrial habitat for amphibians is limited or non-existent (Calhoun and Klemens 2002).

The second pathway, preservation, is not feasible for conserving pool resources of sufficient quality and in sufficient quantity to ensure the long-term viability of pool-breeding amphibian species and populations. Preservation efforts should be applied wherever high-quality pools exist, because preservation can be more successful than regulations at protecting the critical terrestrial habitat surrounding pools. However, numerous individual pools scattered throughout the landscape are harder to include in preservation plans than a single, large wetland.

There is a need to create a new pathway to conserve pool resources that can complement state regulatory programs and preservation efforts: better local land use planning. At the local level, this can be voluntary or codified in land use ordinances (local regulation). Sprawl, or poorly planned land development, is one of the primary causes of habitat loss, which, in turn, has been identified as one of the primary threats to biodiversity (Wilcove et al. 1998; Kirkman et al. 1999; Semlitsch 2003). Research-based management recommendations tend to target conservation at either (1) broad federal, state, or regional scales, or (2) on a site-specific basis. Yet many of the decisions that drive sprawl are made at the local level by town planners, planning and zoning board members, and others who lack knowledge of basic ecological principles and site-specific natural resources. Conservation of pool-breeding amphibian habitat is often most effective at the local level where neighbors, planners, and other concerned citizens play an active stewardship role (Klemens 2000; Preisser et al. 2000). Since the vast majority of land use decisions are made at local levels (Theobald et al. 2000), equipping local land use decision makers with the knowledge and tools necessary to make ecologically informed decisions may be the most effective way to reduce the impacts of sprawl. Translation of 'best available

science' into management strategies, or, in this case, Best Development Practices (BDPs), is a step in the right direction.

This paper demonstrates how such tools and knowledge can be provided to land use practitioners. The BDPs we present here are being implemented in towns in the northeastern U.S. and serve as a model for local planning efforts to conserve seasonal wetlands and the adjacent terrestrial habitat (D. Oscarson, unpublished data). We summarize these strategies for local governances (see Calhoun and Klemens 2002 for more detailed BDPs for towns). Specifically, we highlight the habitat function of seasonal forest pools, including a summary of common development activities most likely to negatively alter these habitat functions, and provide guidance to local governances on how to (1) proactively identify their seasonal forest pool resources, (2) rank pools according to their relative ecological value, and (3) develop management procedures that correspond to the relative rankings. We also include recommended guidelines for development activities associated with pools to be implemented on a pool-by-pool basis or to be adopted as protocol at a landscape scale (see Appendix 1).

#### Seasonal forest pools as wildlife habitat

The definition of seasonal forest pool, or vernal pool, varies among states, resource managers, and scientists (Calhoun and Klemens 2002). In general, and for the purposes of our guidelines, seasonal forest pools are ephemeral to semi-permanent pools that attain maximum depths in spring, and lack permanent surface water connections with other wetlands or water bodies. Pools typically fill with snowmelt or runoff in the spring, although some may be fed primarily by groundwater sources and may begin to refill in the fall. Hydroperiod varies among pools and within pools annually; it ranges along a continuum from less than 30 days to years (Semlitsch 2000). Pools are generally <0.4 ha, with the extent and type of vegetation varying widely. In the northeastern U.S., they provide optimal breeding habitat for animals adapted to temporary, fishless waters including, but not limited to, *Ambystoma* spp. (ambystomatid salamanders), *Hemidactylium scutatum* Tschudi, *Rana sylvatica*, *Scaphiopus holbrookii* Harlan, and

*Eubranchipus* spp. (Hunter et al. 1999; Calhoun and Klemens 2002). In addition, seasonal pools provide foraging and resting habitat for a number of state-listed species including *Clemmys guttata* (Schneider), *C. insculpta* (Le Conte), *Emydoidea blandingii* (Holbrook), and *Thamnophis sauritus* (L.).

Despite their small size and lack of hydrologic connection to permanent water bodies, seasonal forest pools are important landscape components. They make up the vast majority of the total number of wetlands in the landscape and, because of their small size, hydrology, and predominantly private ownership, are wetlands at high risk of loss (Gibbs 1993; Semlitsch and Bodie 1998; Snodgrass et al. 2000). Functionally, seasonal pools provide a network of wetland oases in otherwise forested landscapes. They export biomass, in the form of amphibians and invertebrates, to the adjacent uplands and sustain wetland-dependent wildlife by providing foraging and resting areas and moist, summer refugia (Gibbs 1993, 2000; Semlitsch 1998; 2002; Semlitsch and Bodie 1998; Calhoun and Hunter 2003). Pool-dependent fauna occur in clusters of local populations that are sustained through occasional movements (i.e., colonization, dispersal, migration) among wetlands (Hanski and Gilpin 1991; Gibbs 2000; Semlitsch 2003) and require multiple landscape elements (i.e., wetlands and uplands) to complete their life cycles (Dunning et al. 1992; Dodd and Cade 1997; Pope et al. 2000).

The effects of silvicultural practices on amphibian populations, particularly woodland salamanders, have been widely addressed in the literature (Ash 1988; deMaynadier and Hunter 1995; Calhoun and deMaynadier 2004). There is less published information on the effects on amphibian populations of fragmentation from development in human-dominated landscapes and, to our knowledge, there are no specific recommendations addressing the management of terrestrial habitat for pool-breeding amphibians. Typical regulatory buffers around wetlands range from 15 to 30.5 m, an adjacent terrestrial area insufficient to meet the life history needs of pool-breeding amphibians (Semlitsch 2002; Calhoun and Hunter 2003; Miller and Klemens, in press). Regulatory strategies that focus on protecting only the breeding pools will most likely fail to maintain healthy amphibian populations; protection of critical terrestrial habitat must also be a priority (Windmiller 1990; Semlitsch 1998; Lehtinen et al. 1999; Gibbs 2000;



Semlitsch 2002). Other factors that put pool-breeding amphibian populations at risk in development contexts include spatial isolation of pools and local populations (Berven and Grudzien 1990; Brooks et al. 1998; Semlitsch 2003) and various development practices that degrade habitat quality in pools and in adjacent terrestrial areas. Conversion of natural habitats to impervious surfaces may result in altered hydrologic regimes (Ferguson 1994). Roads may be sources of runoff containing chemicals and pollutants that degrade breeding habitats (Turtle 2000; Forman et al. 2003), while alteration of forested habitat around pools, and use of pools as stormwater detention basins, may also degrade water quality (Keddy 2000).

Roads and stormwater management systems, which are numerous in human-dominated landscapes, have negative effects on amphibian populations either through direct mortality or by acting as barriers to dispersal (Klemens 1990; Fahrig et al. 1995; Gibbs 1998; Lehtinen et al. 1999; Mitchell and Klemens 2000; Egan and Paton 2004). Site clearing around pools for roads or other hard structures alters and eliminates critical overwintering habitat (Windmiller 1996; Regosin et al. 2003a).

Development activities often lead to the creation of new wetlands, as a result of regulations intended to mitigate loss of natural wetlands. These newly created wetlands often lack the structural diversity, microhabitats, and hydrology to support pool-breeding amphibians (DiMauro and Hunter 2002; Lichko and Calhoun 2003; Vasconcelos 2003). Such wetlands can intercept amphibians as they disperse to breeding pools; eggs laid in these 'decoy' wetlands often do not survive.

A variety of other post-construction issues following development (e.g., attraction or introduction of pest species that prey on amphibians, increased use of pesticides, and light spillage) may cause local declines in pool-breeding amphibian populations (see Calhoun and Klemens 2002, for a more detailed discussion). Potential management solutions to these threats are provided in Appendix 1.

### Best Development Practices

The BDPs we present here are based on our current understanding of pool-breeding amphibian

ecology, terrestrial habitat requirements, and how best to maintain local populations in developing landscapes. BDPs are recommended strategies for conserving the wildlife habitat value of seasonal forest pools and their adjacent terrestrial habitat. They may be voluntary or codified through local regulatory mechanisms. Implementation of the BDPs will enable communities to develop long-term, proactive plans for the protection of pool resources as a subset of their overall master planning process. Therefore, citizens and developers may view town management of pools as consistent and predictable, and as a legitimate part of the jurisdiction's accepted and approved development goals. The BDPs include general local planning and pool assessment strategies, as well as specific recommended management zones and guidelines for development activities associated with seasonal forest pools. The management zones and guidelines may be applied on a pool-by-pool basis, or incorporated into governance-wide planning strategies. We suggest three sequential steps for local conservation of pools: (1) mapping and inventory of pools, (2) ecological assessment of pools, and (3) development of conservation plans. Specific recommended guidelines for development activities near pools are provided in Appendix 1.

### *Planning and assessment*

#### *Mapping and inventory*

The goal of local inventory and mapping is to identify exemplary pools or pool clusters in each community. This enables decision-makers, developers, and citizens to understand which sites are of special significance as a community resource. Inventory methods will vary according to the availability of resources, the region of interest, and level of expertise available. Some breeding pools can be located by using aerial photography or National Wetland Inventory (NWI) maps (see Burne 2001 for a primer on identifying and mapping seasonal pools using aerial photography and Geographic Information Systems [GIS]). Before beginning the inventory process we recommend that jurisdictions locate existing aerial photography or wetland maps, and assess the skills and expertise available through volunteers. Funding sources may be available for conducting a professional inventory or, alternatively, local educational

institutions, land trusts, or non-profit organizations may be able to lend support.

Pools, and clusters of pools, may be located using maps, aerial photographs, ground surveys, or a combination of these techniques. If possible, a Geographic Positioning System (GPS) should be used to obtain coordinates, to facilitate creation of a seasonal pool data layer in a Geographic Information System.

*Ecological assessment: prioritizing conservation targets*

We recognize that it is not economically or politically feasible for local governances to protect every pool. For this reason, pool resources must be assessed and priorities for protection must be established. Examining pools in the field and collecting biological data can determine each pool's relative regional or local importance. Trained volunteers, town officials, or professional biologists can collect these data (D. Oscarson, unpublished data). Pools, or clusters of pools within a town, may vary tremendously in quality or ecological significance. In general, we recommend that local governances focus their conservation efforts on pools with relatively undeveloped adjacent terrestrial habitat and ecologically significant pools representing a range of size and hydroperiod (see Tier ratings below). In order to protect a wide diversity of pool-breeding invertebrates and amphibians, pools with long-term conservation opportunities (e.g., pools on public land, not-for-profit lands, or in large tracts of relatively

undisturbed private ownership) should be targeted. Maintaining or restoring the adjacent terrestrial habitat for pools in agricultural or suburban settings where the amount of forest cover is limited is an option for long-term management of otherwise productive pools.

Rating the ecological significance of an individual pool is not a simple process. For this reason, we provide general guidance for assessment of pool ecological significance based on two parameters: (1) biological rating or value of the pool and (2) condition of the adjacent terrestrial habitat (Table 1). The biological rating is based on species abundance, species diversity, and presence of federal- or state-listed species. Assessment of the adjacent terrestrial habitat includes the integrity of the pool's envelope (i.e., land within 30 m from the pool's edge) and critical terrestrial habitat (i.e., land from 30–230 m from the pool's edge). To assist in this process, we developed tier ratings (i.e., prioritizing for protection) based on the pool's biological attributes and the condition of the adjacent habitat (Table 2). Tier 1 pools are top priority for protection.

The biological criteria presented in Table 1 are fairly straightforward with the exception of the egg mass abundance criterion. The egg mass threshold should be treated as a guideline, not as an unchangeable rule. Data on the percentage of biologically active pools, based on numbers of egg masses and on species presence, that are necessary to maintain local pool-breeding amphibian populations in any given area have

Table 1. Seasonal pool ecological assessment criteria.

*A. Biological Value of the Vernal Pool*

(1) Are there any state-listed (Endangered, Threatened, or Special Concern) species present or breeding in the pool?

Yes \_\_\_\_\_ No \_\_\_\_\_

(2) Are there two or more vernal pool indicator species (see Table 3) breeding (i.e., evidence of egg masses, spermatophores [sperm packets], mating, larvae) in the pool?

Yes \_\_\_\_\_ No \_\_\_\_\_

(3) Are there 25 or more egg masses (regardless of species) present in the pool by the conclusion of the breeding season?

Yes \_\_\_\_\_ No \_\_\_\_\_

*B. Condition of the Critical Terrestrial Habitat*

(1) Is at least 75% of the vernal pool envelope (100 feet from pool) undeveloped<sup>1</sup>?

Yes \_\_\_\_\_ No \_\_\_\_\_

(2) Is at least 50% of the critical terrestrial habitat (100–750 feet) undeveloped?

Yes \_\_\_\_\_ No \_\_\_\_\_

<sup>1</sup> "Undeveloped" land is defined as open land largely free of roads, structures, and other infrastructure; undeveloped land may include forested or partially forested land, shrubland, or open agricultural land.

Table 2. Ranking of seasonal pools based on assessment criteria.

No. of questions answered YES in Table 1, Category A	No. of questions answered YES in Table 1, Category B	Tier Rating
1-3	2	Tier I
1-3	1	Tier II
1-3	0	Tier III
0	1-2	Tier III

not been published, although modeling efforts to provide this guidance are underway (P. deMaynadier, unpublished data). Ideally, the goal should be to maintain natural density and historical distribution patterns (see Stone 1992; Brooks et al. 1998; and Calhoun et al. 2003 for pool density estimates in New England), although this may be possible only in less developed portions of a region. In the absence of models or guidance from the literature, we chose 25 egg masses as a threshold for ecological significance based on egg mass count data from New England that were available at the time of publication of the original BDPs (see Calhoun and Klemens 2002). The intent of the 25 egg mass threshold was to include at least half of located pools, while eliminating inclusion of secondary breeding sites such as incidental roadside ditches and skidder ruts. Data obtained more recently (e.g., Crouch and Paton 2000; Middlesex County Soil and Water Conservation District 2000; Calhoun et al. 2003; Egan and Paton 2004; R. Baldwin, unpublished data; B. Windmiller, unpublished data; D. Oscarson, unpublished data) indicate that this threshold should be set substantially higher, at least in southern New England, per-

haps in the range of 40 to 60 egg masses. Because egg mass numbers vary regionally and annually, and because new data and analyses can continually refine the BDP process, each local governance should ideally complete its own biological inventory and determine the local threshold for this criterion based on inventory results.

In the seasonal pool assessment (Table 1), less than 25% of the area within the first 30 m of the pool edge and 50% or less of the remaining adjacent terrestrial habitat out to 230 m must be undeveloped for a pool to be rated Tier I or II. However, management goals for the terrestrial zones are more stringent: no disturbance within the first 30 m of the pool edge, with only 25% of the remaining terrestrial habitat developable (see Figure 1). The few studies that have been conducted on this topic suggest that development (i.e., buildings, impermeable surfaces, roads, lawns) that impacts 25–30% or more of the habitat surrounding pools causes local declines in breeding populations of amphibians (J. Gibbs, unpublished data; B. Windmiller, unpublished data). The assessment criteria are less stringent than the overall management recommendations because the uplands surrounding pools within developing landscapes have often already been compromised. Higher management standards are recommended to reduce development pressures in the critical zones of pools that occur in developing landscapes. In such cases, restoration may also reverse previous impacts.

#### Development of conservation plans

Local decision-makers can target high priority pools and pool clusters, identified by their inventory and assessment, for local protection.

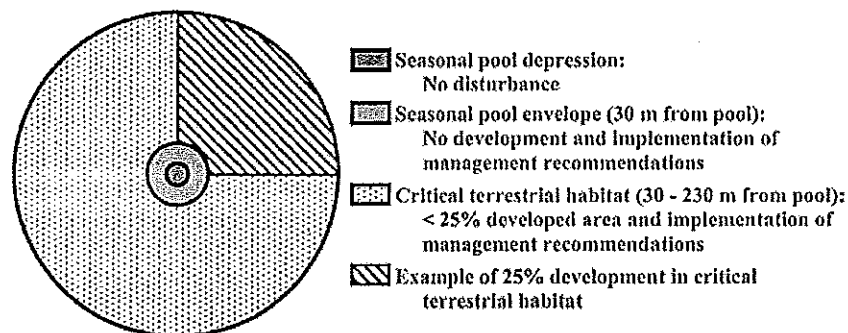


Figure 1. Seasonal pool recommended management zones and corresponding management recommendations.

The driving impetus for this priority setting exercise is that protecting a smaller number of high-priority pools is preferable, from a conservation standpoint, to protecting a greater number of pools that lack the critical terrestrial habitat, or the potential to restore such habitat, needed to sustain populations of pool-breeding species. From a developer's perspective, priority setting provides certainty as to where locally important, significant resources are located. This should replace the *status quo* of strong opposition to almost every development near a pool, regardless of the relative ecological viability of the pool. Once conservation priorities are established, there are a variety of mechanisms that local jurisdictions may employ to achieve these goals. Some of these are presented below.

#### *Incorporation into comprehensive, development, or master plans*

Community comprehensive plans should incorporate the goals of these pool protection strategies, justification for those goals, and locations of exemplary pools that have been targeted for stewardship. There are 2 primary reasons for doing this:

- (1) *Clarity* – It is very important that all stakeholders (i.e., property owners, citizens, developers, and local decision-makers) are aware of the goals of pool protection and which properties are considered essential to achieving those goals. This provides some level of certainty in what can be a chaotic case-by-case debate.
- (2) *Security* – If a community clearly articulates its goals and objectives in a written, publicly adopted document, and then consistently follows those guidelines, it is less susceptible to legal challenges. Legal challenges against municipal decisions are most successful if it can be demonstrated that those decisions are capricious, without reasoned basis, and therefore inconsistent with a community's articulated goals and policies.

#### *Acquisition*

Land acquisition is expensive and therefore not often feasible for communities. However, under certain circumstances it might be possible for a community or land trust to acquire key properties. We recommend acquisition of individual Tier I pools; the acquisition should target a minimum of

230 m of land from the pool depression in all directions. In addition, acquisition efforts are appropriate for large blocks of undeveloped land with clusters of pools of any tier.

#### *Easements*

On subdivision projects where undeveloped land with seasonal forest pools is reserved, we recommend that the developer convey a conservation easement to a local land trust, the municipality, or a conservation or scientific not-for-profit organization. In our experience this conservation strategy is far superior to reliance on a homeowner's association to protect these resources. The holder of the easement would be responsible for ensuring that the terms of the easement are being met, and for informing the neighbors about the stewardship needs of the property.

#### *Overlay zones*

The town can adopt a resource overlay zone specifically designed to protect high-priority seasonal pools. Resource overlay zones leave existing town zoning in place while applying additional development standards, requirements, or incentives in the overlay zone. This would be particularly effective where clusters of Tier I and Tier II pools occur, or where pools display a range of hydroperiods. We recommend that towns adopt a resource overlay zone to encompass those pools and critical terrestrial habitats that have been designated as protection priorities. The zone could provide a mix of regulations, including compliance with the Recommended Guidelines in Appendix 1, and incentives to conserve pools and preserve economic equity (see Calhoun and Klemens 2002).

#### *Wetland ordinances*

Some jurisdictions have developed ordinances specifically to protect seasonal pools and their associated terrestrial habitat. Rather than use rating systems that place undue emphasis on number of species present or size of pools, we recommend using the BDPs as a foundation for seasonal pool management.

#### *Recognition and voluntary stewardship programs*

Programs that encourage pool stewardship could be set up to provide technical advice and recognition to landowners who voluntarily protect and

manage these resources; programs could also provide training for municipal officials. Another approach would be to publicly recognize those developments that adhere to pool BDPs. Apart from demonstrating that it is possible to develop responsibly, such recognition may be an important marketing tool. For example, in Farmington, Connecticut, USA., a small development has been created that has turned a pool and its resources into the centerpiece of the development and its marketing of the project.

#### *Management zones and goals for seasonal forest pools*

To this point, the BDPs have focused on conservation of pool-breeding amphibian habitat at a landscape scale necessary for local planning initiatives. Below, we provide guidance for management of pools that can be applied to all the exemplary pools within the watershed or that can be applied to individual pools. This may be particularly useful for land use decision makers faced with approving development activities on a case-by-case basis.

We define three pool management zones (Figure 1), based on known travel distances and habitat-use patterns of some pool-breeding amphibians in the northeastern USA (Table 3). These are the pool depression, the pool envelope (i.e., the area within 30 m of the pool edge), and the critical terrestrial habitat (i.e., the area 30–230 m from the pool edge). This total recommended conservation zone of 230 m differs from the 122-m zone proposed by Calhoun and deMaynadier (2004) for best management practices for forestry because of landscape context. In managed forests, logged areas may regenerate to forest and will provide shade and cover in a rela-

tively short period of time. However, in the context of development, built-up areas are typically permanently lost as terrestrial habitat or as travel corridors.

Adult travel distances from natal pools have been documented through radio-tracking of individual adult salamanders and through pit fall arrays (Semlitsch 1981; Madison 1997; Madison and Farrand 1998; Faccio 2003; Vasconcelos 2003; R. Baldwin, unpublished data). Ambystomatid salamanders and ranid frogs often travel hundreds of meters to and from breeding ponds and among wetlands during the non-breeding season (Semlitsch 2002; Regosin et al. 2003a). Reported maximum travel distances from breeding pools for adult ambystomatid salamanders range from 198 m for adult *A. laterale* Hallowell to 625 m for *A. jeffersonianum* Green. Mean reported distances traveled from natal pools range from 130 m for *A. maculatum* Shaw to 213 m for *A. jeffersonianum* (Faccio 2003). Juvenile *R. sylvatica* have been documented traveling as far as 472 m from natal pools, while adults have been documented summing over 300 m from their natal pools (Vasconcelos 2003; R. Baldwin, unpublished data). Our proposed conservation zone of 230 m falls within the range of the 160–290 m amphibian critical core habitat around wetlands proposed by Semlitsch (2003) for maintaining local amphibian populations. A zone of 230 m may protect 95–100% of local pool-breeding salamanders (Faccio 2003) and the vast majority of *R. sylvatica*. A caveat is that even a conservation zone this large is conservative and assumes non-random distribution of animals; it will not necessarily provide linkages among other breeding pools needed for long-term survival of local populations. Highly fragmented landscapes that isolate ponds at distances greater than 1 km can preclude the recolonization of pools and result in the disappearance

Table 3. Seasonal pool-breeding amphibians and reported migration distances.

Indicator species	Maximum migration distance <sup>1</sup> (mean distance)	Number of studies contributing data
<i>Ambystoma laterale</i>	~198 m	3
<i>Ambystoma jeffersonianum</i>	625 m (198 m)	3
<i>Ambystoma maculatum</i>	249 m (129 m)	6
<i>Ambystoma opacum</i>	n/a	
<i>Rana sylvatica</i>	472 m	1
<i>Scaphiopus holbrookii</i>	n/a	

<sup>1</sup> Adapted from Calhoun and deMaynadier (2004).

of local populations in the landscape (Laan and Verboom 1990). Therefore, where landscapes are particularly pool-rich, preservation of large pool-upland complexes is recommended. Our goal is to minimize impacts to wildlife and to sustain viable populations within the context of a developing landscape. Specific recommended guidelines for common development activities that may threaten the integrity of any one of these zones are provided in Appendix 1.

#### *Pool depression*

This pool management zone includes the pool depression up to the spring high-water mark. The management goal for this zone is to maintain the pool basin, associated vegetation, and the pool water quality in an undisturbed state. Due to seasonal fluctuations in water levels, the pool depression may or may not be wet during the period when a development review is initiated. During the dry season, the high-water mark generally can be determined by the presence of blackened leaves stained by water or silt, aquatic debris along pool edges, water marks on surrounding trees or rocks, or a clear change in topography from the pool edge to the adjacent upland.

The pool provides breeding and nursery habitat for pool-breeding amphibians and invertebrates. Rutting or compaction of soil in the depression by vehicular equipment can alter pool hydrology, disturb eggs and larvae, and alter water quality through siltation or introduction of pollutants. Development in the pool depression in the winter may damage vegetation in the pool that potentially provides egg attachment sites and pool shade (Calhoun and deMaynadier 2004).

#### *Pool envelope*

The pool envelope extends 30 m from the pool's edge at spring high water. The management goals for this zone are: (1) to maintain shady, cool, moist forest floor conditions with abundant leaf litter and coarse woody debris through maintenance of a relatively undisturbed forest; (2) to allow free movement of amphibians to and from breeding pools; (3) to provide shade and leaf litter to the pool depression; and (4) to protect the water quality of the pool.

This zone is key terrestrial habitat for breeding amphibians and provides terrestrial nursery

habitat for amphibian metamorphs. Adult *R. sylvatica* and *Ambystoma* spp. metamorphs exhibit significant non-random, directed dispersal orientation towards undisturbed forest versus clearcuts or other disturbances (Semitsch 1981; Windmiller 1996; deMaynadier and Hunter 1999; Rothermel and Semlitsch 2002; Vasconcelos and Calhoun 2004). In the spring, high densities of adult salamanders and frogs occupy the habitat within 30 m of the breeding pool (Regosin et al. 2003b; Vasconcelos and Calhoun 2004). Close proximity to pools may provide a selective advantage, enabling males to breed early and often. The same patterns were documented for *A. maculatum* (Regosin et al. 2003b). Metamorphs are particularly vulnerable to desiccation for the first 6 months after metamorphosis (Semlitsch 1981). In the late summer and early fall, large numbers of recently metamorphosed salamanders and frogs (Vasconcelos and Calhoun 2004) and male adult salamanders and frogs occupy this same area (Regosin et al. 2003b).

#### *Critical terrestrial habitat*

The critical terrestrial habitat extends ~200 m beyond the upland edge of the seasonal pool envelope (i.e., the zone 30–230 m beyond the edge of the pool depression). The management goals for this zone are to: (1) maintain or restore a minimum of 75% of the zone in relatively undisturbed forest as habitat for summer foraging and winter hibernacula; and (2) provide habitat through which animals may disperse to other pools for breeding or for summer refuge.

Limited data exist on summer home ranges and wintering areas of pool-breeding amphibians, but emergence data suggest that adults may travel hundreds of meters to other isolated pools, forested wetlands, small streams, or upland refugia where summer home ranges are established (Heatwole 1961; Bellis 1965; R. Baldwin, unpublished data; B. Windmiller, unpublished data). Holman et al. (2003) found that 40% of *R. sylvatica*, 52% of *A. laterale*, and 60 % of *A. maculatum* populations associated with three seasonal pools in Massachusetts overwintered greater than 100 m from breeding pools. A summary of management goals and recommendations for all 3 zones is presented in Table 4.

Table 4. Management recommendation for seasonal pools and surrounding management zones in developing landscapes.

Management Zone (distance from pool edge)	Area of Zone <sup>1</sup> (ha)	Primary Wildlife Habitat Values	Management Goals	Management Recommendations
<i>Seasonal Pool Depression</i> (1/4a)	0.07	Breeding pool; egg attachment sites; larval development site.	Maintain good water quality and water-holding capacity; undisturbed basin with native vegetation along the margin	No disturbance
<i>Seasonal Pool Envelope</i> (30 m)	0.57	Shade and organic inputs to pool; upland staging habitat for juvenile amphibians.	Maintain forested envelope around pool; avoid barriers to amphibian movement; prevent alteration of water quality or pool hydrology.	No development; implementation of Recommended Guidelines (see Appendix 1) for this zone.
<i>Critical Terrestrial Habitat</i> (~230 m)	18.25	Upland habitat for pool-breeding amphibians (for foraging, migration, and hibernating).	Maintain partially shaded forest floor with deep, moist uncompact litter and abundant coarse woody debris.	Less than 25% developed area; implementation of Recommended Guidelines (see Appendix 1) for this zone.

<sup>1</sup> Adapted area, based on a 30.5-m diameter pool.

## Conclusions

Strategies or BDPs for conserving seasonal forest pools within urbanizing landscapes are based on the best available science. Further research should be conducted to develop and refine our understanding of seasonal pool resources and the effects of land use practices on those resources. In the interim, it is imperative that currently available research results, albeit incomplete, be translated into tools that can be applied by land use decision-makers. A mechanism for revisions based on later research developments should be part of the overall planning process. Seasonal forest pools and many other habitats are rapidly being destroyed or altered as sprawl overtakes formerly rural regions. If we, as conservation scientists, do not create tools such as best development practices, then they will continue to be crafted, but without a biological perspective. If we mistakenly choose not to sit at the table, we should be aware that the banquet will continue without us.

## Acknowledgments

This project was made possible through support from the Doris Duke Charitable Foundation, the Surdna Foundation, Sweet Water Trust, the Maine Audubon Society, and the Maine Department of Environmental Protection. We are grateful to the following people for their thoughtful reviews and participation in regional meetings: Al Breisch, Matt Burne, Elizabeth Colburn, Rich Cook, Mark Ferguson, Frank Golet, Hank Gruner, John Kanter, Ruth Ladd, Carol Murphy, Peter Paton, and Chris Raithel. We especially thank Bryan Windmiller for his participation in meetings and for providing us with his unpublished data on the impact of development around seasonal pools. We also thank Frank Golet for his critical review that greatly improved the manuscript. The concepts presented in this manuscript received input and review from professionals in the development community. This is Maine Agriculture and Forest Experiment Station Paper #2699.

## Appendix 1

(Adapted from Calhoun and Klemens 2002). Recommended guidelines for development activities near seasonal woodland pools.

### *Roads and driveways*

1. Roads and driveways should be excluded from the pool depression and pool envelope.
2. Roads and driveways with projected traffic volumes in excess of 5–10 cars per hour should not be sited within ~230 m of a seasonal pool (Windmiller 1996). Regardless of traffic volumes, the total length of roads within the critical terrestrial habitat should be limited to the greatest extent possible (Egan and Paton, 2004).
3. Use curbing with a 1:4 slope that small animals can cross (Cape Cod-style curbing) or no-curb alternatives on low capacity roads.
4. Use oversize square box culverts (2 × 3 ft) near wetlands and known amphibian migration routes to facilitate amphibian movement under roads. These should be spaced at 6-m intervals *and* use curbing to deflect amphibians toward the box culverts.
5. Use cantilevered roadways (i.e., elevated roads that maximize light and space underneath) to cross low areas, streams, and ravines that may be important amphibian migratory routes.
6. Cluster development to reduce the amount of roadway needed and place housing as far from vernal pools as possible.

### *Site clearing, grading, and construction activities*

1. Minimize disturbance and protect existing buffer areas to the extent practicable.
2. Site clearing, grading, and construction activities should be excluded from the pool depression *and* the pool envelope.
3. Site clearing, grading, and construction activities should be limited to less than 25% of the entire pool habitat (i.e., the pool depression, envelope, and critical terrestrial habitat).
4. Limit the area of clearing, grading, and construction by clustering development.
5. Minimize erosion by maintaining vegetation cover on steep slopes.
6. Avoid creating ruts and other artificial depressions that hold water. If ruts are created, refill to grade before leaving the site.
7. Refill percolator test holes to grade.
8. Use erosion and sediment control best management practices to reduce erosion. Stagger silt

fencing with 6-m breaks to avoid disrupting amphibian movements or consider using erosion control berms. Use combinations of silt fencing and hay bales to reduce barrier effects. Re-seed and stabilize disturbed areas immediately; permanent stabilization for revegetated areas means that each area maintains at least 85% cover. Remove silt fencing as quickly as possible and no later than 30 days following final stabilization. Minimize use of silt fencing within ~230 m of pools. Erosion control berms can be leveled and used as mulch or removed upon final stabilization.

9. Limit forest clearing on individual house lots within the developed sections of the pool management zones to no more than 50% of lots that are 0.8 ha or more in size. Encourage landscaping with natural woodland, containing native understory and groundlayer vegetation, as opposed to lawn.

10. Silt fencing *should* be used to exclude amphibians from active construction areas. However, construction activities should, ideally, occur outside of peak amphibian movement periods for the amphibian species occurring in your region (which include early spring and fall breeding and mid-late summer dispersal).

### *Stormwater management*

1. Pool depressions should never be used, either temporarily or permanently, for stormwater detention or biofiltration.
2. Detention and biofiltration ponds should be located at least 230 m from a pool; they should never be sited between pools or in areas that are primary amphibian overland migration routes, if known.
3. Treat stormwater runoff using grassy swales with less than 1:4 sloping edges. If curbing is required, use Cape Cod curbing. Maximize open drainage treatment of stormwater.
4. Use hydrodynamic separators only in conjunction with Cape Cod curbing or swales to avoid funneling amphibians into treatment chambers, where they are killed.
5. Maintain inputs to the vernal pool watershed at pre-construction levels. Avoid causing increases or decreases in water levels.
6. Minimize impervious surfaces (i.e., surfaces that do not absorb water) to reduce runoff prob-



lems and resulting stormwater management needs. Use of grass pavers (concrete or stone that allows grass to grow) on emergency access roads and in low use parking areas is recommended. Use of phantom parking is also recommended. Zoning formulae often require more parking spaces than are actually needed. Under a phantom parking strategy, sufficient land is reserved for projected parking requirements, but only a portion of the parking area is constructed at the outset. Additional areas are paved on an as-needed basis.

7. Examine the feasibility (which varies by location) of reducing the road width standard to achieve conservation goals (i.e., minimize the footprints of roads). This is often done in tandem with development clustering, to reduce impervious surfaces and disturbance areas.

#### *Lighting*

1. Exterior and road lighting within 230 m of a pool should use low spillage lights – those that reflect light directly downward onto the area to be illuminated. A variety of products to accomplish this goal are now on the market. Avoid using fluorescent and mercury vapor lighting.

#### *Wetland creation and alteration*

1. Alteration of natural conditions within seasonal forest pools and other small wetlands should be avoided.

2. Creation of ponds and similar wetlands should be avoided within 230 m of a pool.

3. Redirect efforts from *creating* low-value, generalized wetlands to *enhancing* terrestrial habitat around pools. These enhancements could include reforestation of post-agricultural lands within 230 m of a pool, restoration of forest, importing additional cover objects (e.g., logs, stumps), and removal of invasive plants and animals.

#### *Post-construction activities*

1. Discourage predators by making garbage and other supplemental food sources unavailable.

2. Consider keeping cats indoors at all times. This would reduce depredation on a wide variety of species, ranging from pool-breeding amphibians to ground-nesting birds. Attaching bells to cat collars does not significantly reduce the ability of cats to prey on small vertebrates.

3. Mark the edge of a protected area (e.g., the critical terrestrial habitat) with permanent markers. Well-marked boundaries make enforcement of restricted areas clear to both homeowners and the local wetlands enforcement agencies. For example, granite monuments or stone cairns could be placed every 3 m around a protected area. In cases where intrusion is a concern, small sections of stonewall could be erected; these walls should be discontinuous, so that they do not impede amphibian movements.

4. Use covenants or deed restrictions to assure that the vernal pool and its envelope are conserved and that pesticide use, lot clearing, and other degrading activities are kept out of associated areas. Assign the homeowner or homeowner's association with responsibility for ensuring that conditions of the covenant or deed restriction are met. Provisions should also be included to allow a third party, such as the town or local land trust, to enter the property with adequate notice, and conduct appropriate management and remediation, charging the homeowner for these services.

5. In the case of a homeowner's association or other type of multiple tenant arrangement, a stewardship manual could be prepared that would educate each purchaser, or lessee, as to the unique nature of the property they are purchasing or renting, what their collective obligations to protect the resource entail, and where to obtain additional assistance or information.

6. A conservation easement, covering at minimum the vernal pool depression and vernal pool envelope (and, preferably, including land within the 'critical terrestrial habitat'), could be held by a municipality, land trust, or other non-governmental organization.

#### *References*

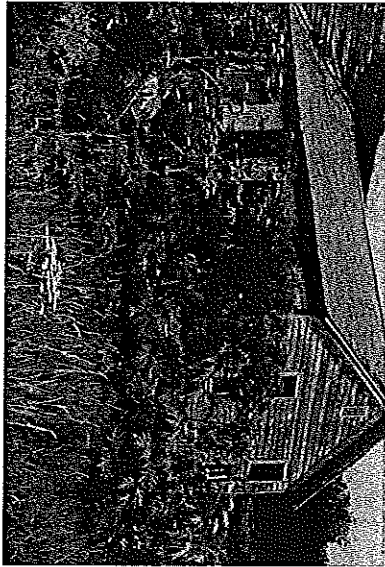
- Alford R.A. and Richards S.J. 1999. Global amphibian declines: a problem in applied ecology. *Ann. Rev. Ecol. Syst.* 30: 133–165.

- Ash A.N. 1988. Disappearance of salamanders from clearcut plots. *J. Elisha Mitchell Sci. Soc.* 104: 116–122.
- Bellis E.D. 1965. Home range and movements of the wood frog in a northern bog. *Ecology* 46: 90–98.
- Berven K.A. and Grudzien T.A. 1990. Dispersal in the wood frog (*Rana sylvatica*): implications for genetic population structure. *Evolution* 44: 2047–2056.
- Brooks R.T., Stone J. and Lyons P. 1998. An inventory of seasonal forest ponds on the Quabbin Reservoir watershed, Massachusetts. *Northeastern Nat.* 5: 219–230.
- Burne M.R. 2001. Massachusetts Aerial Photo Survey of Potential Vernal Pools. Natural Heritage and Endangered Species Program, Department of Fisheries and Wildlife, Westborough, Massachusetts, USA.
- Calhoun A.J.K. and deMaynadier P. 2004. Forestry Habitat Management Guidelines for Vernal Pool Wildlife. MCA Technical Paper No. 6, Metropolitan Conservation Alliance, Wildlife Conservation Society, Bronx, New York, USA.
- Calhoun A.J.K. and Hunter M.L.Jr. 2003. Managing ecosystems for amphibian populations. In: Semlitsch R.D. (ed.), *Amphibian Conservation*. Smithsonian Institution Press, Washington, D.C., pp. 228–241.
- Calhoun A.J.K. and Klemens M.W. 2002. Best Development Practices: Conserving Pool-breeding Amphibians in Residential and Commercial Developments in the Northeastern United States. MCA Technical Paper No. 5, Metropolitan Conservation Alliance, Wildlife Conservation Society, Bronx, New York, USA.
- Calhoun A.J.K., Walls T.E., McCollough M. and Stockwell S. 2003. Developing conservation strategies for vernal pools: a Maine case study. *Wetlands* 23: 70–81.
- Carey C., Cohen N. and Rollins-Smith. 1999. Amphibian declines: an immunological perspective. *Dev. Comp. Immunol.* 23: 459–472.
- Crouch W.B. and Paton P.W.C. 2000. Using egg-mass counts to monitor wood frog populations. *Wildlife Soc. Bull.* 28: 895–901.
- deMaynadier P.G. and Hunter M.L.Jr. 1995. The relationship between forest management and amphibian ecology: a review of the North American literature. *Environ. Rev.* 3: 230–261.
- deMaynadier P.G. and Hunter M.L.Jr. 1999. Forest canopy closure and juvenile emigration by pool-breeding amphibians in Maine. *J. Wildlife Manage.* 63: 441–450.
- DiMauro D. and Hunter M.L.Jr. 2002. Reproduction of amphibians in natural and anthropogenic temporary pools in managed forests. *Forest Sci.* 48: 397–406.
- Dodd C.K.Jr. and Cade B.S. 1997. Movement patterns and the conservation of amphibians in small, temporary wetlands. *Conserv. Biol.* 12: 331–339.
- Dunning J.B., Danielson B.J. and Pulliam H.R. 1992. Ecological processes that affect populations in complex landscapes. *Oikos* 65: 169–175.
- Egan R.S. and Paton P.W.C. 2004. Within-pond parameters affecting oviposition by wood frogs and spotted salamanders. *Wetlands* 24: 1–13.
- Faccio S.D. 2003. Post-breeding emigration and habitat use of radio-implanted Jefferson and spotted salamanders in Vermont. *J. Herpetol.* 37: 479–489.
- Fahrig L., Pedlar J.H., Pope S.E., Taylor P.D. and Wegner J.F. 1995. Effect of road traffic on amphibian density. *Biol. Conserv.* 73: 177–182.
- Ferguson B.K. 1994. *Stormwater Infiltration*. Lewis Publishing, New York, New York, USA.
- Forman R.T.T., Sperling D., Bissonette J.A., Clevenger A.P., Cutshall C.D., Dale V.H., Fahrig L., France R., Goldman C.R., Heanue K., Jones J.A., Swanson F.J., Turrentine T. and Winter T.C. 2003. *Road Ecology: Science and Solutions*. Island Press, Washington, D.C., USA.
- Fretwell J.D., Williams J.S. and Redman P.J. (compilers). 1996. *National Water Summary on Wetland Resources*. USGS Water Supply Paper 2425, Washington, USA.
- Gibbs J.P. 1993. Importance of small wetlands for the persistence of local populations of wetland-associated animals. *Wetlands* 13: 25–31.
- Gibbs J.P. 1998. Distribution of woodland amphibians along a forest fragmentation gradient. *Landscape Ecol.* 13: 263–268.
- Gibbs J.P. 2000. Wetland loss and biodiversity conservation. *Conserv. Biol.* 14: 314–317.
- Hanski I. and Gilpin M.E. 1991. Metapopulation dynamics: brief history and conceptual domain. *Biol. J. Linn. Soc.* 42: 3–16.
- Heatwole H. 1961. Habitat selection and activity of the woodfrog, *Rana sylvatica*. *Am. Midl. Nat.* 66: 301–313.
- Holman R.N., Regosin J.V., Rodrigues D.M., Reed M.J., Windmiller B.S. and Romero L.M. 2003. Impacts of varying habitat quality on the physiological stress of spotted salamanders (*Ambystoma maculatum*). *Anim. Conserv.* 6: 11–18.
- Hunter M.L.Jr., Calhoun A.J.K. and McCollough M. 1999. *Amphibians and Reptiles of Maine*. University of Maine Press, Orono, Maine, USA.
- Keddy P.A. 2000. *Wetland Ecology: Principles and Conservation*. Cambridge University Press, Cambridge, UK.
- Kirkman L.K., Golladay S., LaClaire L. and Sutter R. 1999. Biodiversity in southeastern seasonally-ponded isolated wetlands: management and policy perspectives for research and conservation. *J. N. Am. Benthol. Soc.* 18: 553–562.
- Klemens M.W. 1990. *The Herpetofauna of Southwestern New England*. Ph.D. Dissertation. University of Kent, Canterbury, UK.
- Klemens M.W. 2000. *Amphibians and Reptiles in Connecticut: A Checklist with Notes on Conservation Status, Identification, and Distribution*. Connecticut Department of Environmental Protection, DEP Bulletin No. 32, Hartford, Connecticut, USA.
- Laan R. and Verboom B. 1990. Effects of pools size and isolation of amphibian communities. *Biol. Conserv.* 54: 251–262.
- Lannoo M.J. (ed.) 1998. *Status and Conservation of Midwestern Amphibians*. University of Iowa Press, Iowa City, Iowa, USA.
- Lehtinen R.M., Galatowitsch S.M. and Tester J.R. 1999. Consequences of habitat loss and fragmentation for wetland amphibian assemblages. *Wetlands* 19: 1–12.
- Lichko L. and Calhoun A.J.K. 2003. An Assessment of vernal pool creation attempts in New England: a review of project documentation from 1991–2000. *Environ. Manage.* 32: 141–151.
- Madison D.M. 1997. The emigration of radio-implanted spotted salamanders, *Ambystoma maculatum*. *J. Herpetol.* 31: 542–552.
- Madison D.M. and Farrand L.III. 1998. Habitat use during breeding and emigration in radio-implanted Tiger Salamanders, *Ambystoma tigrinum*. *Copeia* 2: 402–410.

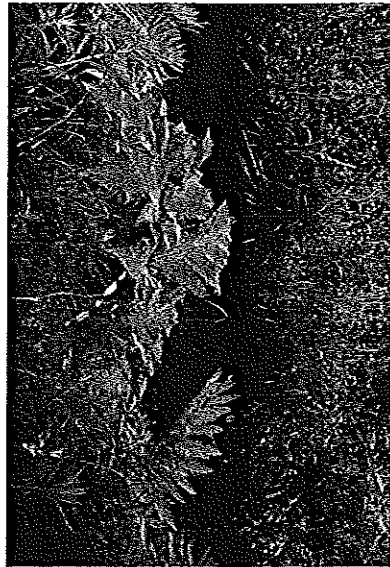
A Herculean stem!



Giant Hogweed in late summer: Seeds are forming.



Giant Hogweed in a riparian area.



## Prevention and Control

The most important first step a landowner can take to control Giant Hogweed is to contact the U.S. Department of Agriculture (USDA) or the state department of agriculture. Check the back panel of this brochure for the appropriate contact information.

Some state departments of agriculture have active survey and management programs for Giant Hogweed. Since Hogweed seeds may remain dormant in the soil for at least 5 years, eradication requires a long term commitment. Once Hogweed becomes established in an area, eradicating it requires persistence.

Mowing, cutting and weed whacking are not recommended as a means of control because the plant's large perennial root system soon sends up new growth. Also, these tactics are risky because they increase opportunities for homeowners to come in contact with the plant's sap.

Giant Hogweed is spread naturally by seeds, which can be wind-blown and scattered several feet from the parent plant or may be carried by water to invade new areas. However, people are usually responsible for spreading Giant Hogweed over long distances. Seeds or young plants from a friend's garden, planted in new locations, help spread this weed quickly over distances much greater than the plant would spread naturally. The dried fruit clusters are sometimes used in decorative arrangements, and when discarded outdoors, can start a new patch of Giant Hogweed.

If you wish to learn more about Giant Hogweed and have internet access, simply do a search for Giant Hogweed, and you will find numerous sources of information, including photographs of this plant and other plants commonly mistaken for it.

IF YOU SUSPECT A PLANT  
IS GIANT HOGWEED,  
CONTACT EITHER YOUR STATE  
DEPARTMENT OF AGRICULTURE

OR  
THE UNITED STATES  
DEPARTMENT OF AGRICULTURE



U. S. Dept. of Agriculture  
Animal & Plant Health  
Inspection Service  
Plant Protection & Quarantine  
[www.aphis.usda.gov/ppq/weeds](http://www.aphis.usda.gov/ppq/weeds)

## About Giant Hogweed

Giant Hogweed is a member of the carrot or parsley family (Apiaceae) that was introduced into Europe and North America in the early 1900s. It is native to the Caucasus region of Eurasia. Its massive size and imposing appearance made it desirable for arboretums and gardens. Giant Hogweed soon escaped from cultivation and became established in rich, moist soils along roadside ditches, stream banks, waste ground, along tree lines and open wooded areas. In the U.S. it is known to occur in Connecticut, District of Columbia, Illinois, Indiana, Maine, Maryland, Massachusetts, Michigan, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Oregon, Vermont, Washington, and Wisconsin. The plant's name comes from Hercules, of ancient mythological fame, and Giant Hogweed is aptly described as robust in appearance.

## Hogweed is Hazardous

This tall majestic plant is a public health hazard because of its potential to cause severe skin irritation in susceptible people. Plant sap produces painful, burning blisters within 24 to 48 hours after contact. Plant juices also can produce painless red blotches that later develop into purplish or brownish scars that may persist for several years. For an adverse reaction to occur, the skin, contaminated with plant juices, must be moist (perspiration) and then exposed to sunlight. Some other plants are capable of causing this reaction, known as phytophotodermatitis (Phyto=plant, Photo=light), including several that are also in the Giant Hogweed family.

# Giant Hogweed

*Heracleum mantegazzianum*

An attractive but dangerous noxious weed- Have you seen this plant?





# Giant Hogweed Plant

**Giant Hogweed** is a biennial or perennial herb growing from a forked or branched taproot. Plants sprout in early spring from the roots or from seeds.

## How to Recognize Giant Hogweed

The best time to identify Giant Hogweed is when it's blooming

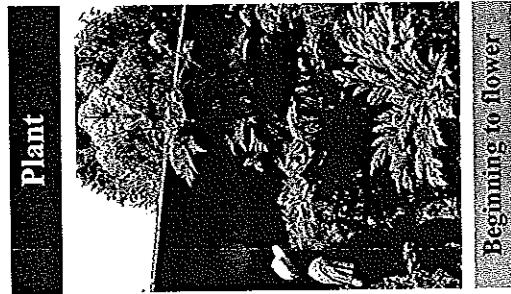
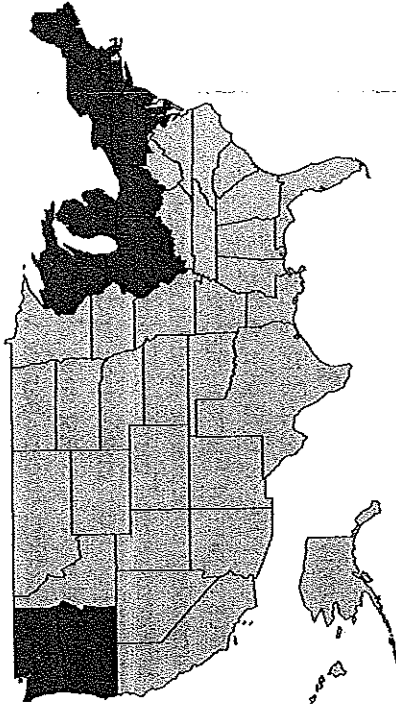
**Flowers:** numerous small white flowers in June or July, clustered into a flat-topped umbel up to 2½ ft. across.

**Stems** are hollow, ridged, 2-4 in. in diameter, 8-14 ft. tall, with purple blotches and coarse white hairs. The hairs are especially prominent that circle the stem at the base of the leaf stalks.

**Leaves** are lobed, deeply incised and up to 5 ft. across.

**Fruit** (containing the seed) is dry, flattened, oval, about 3/8 in. long and tan with brown lines.

Giant Hogweed, *Heracleum mantegazzianum*



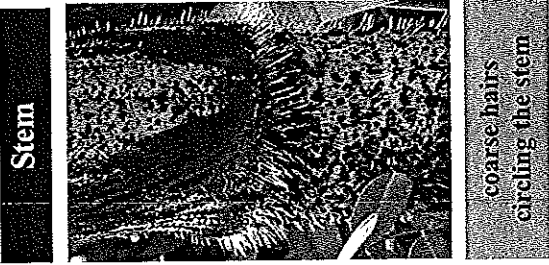
Plant

Beginning to flower



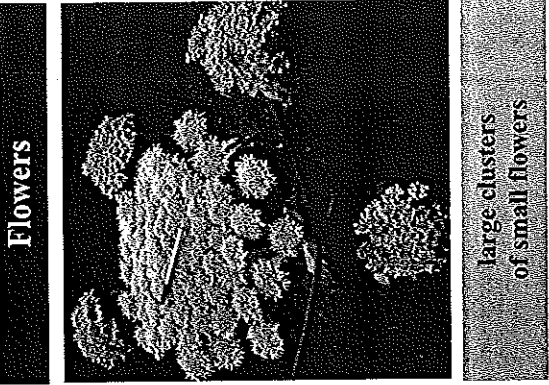
Leaf

huge leaves



Stem

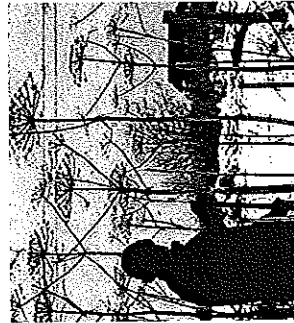
coarse hairs  
circling the stem



Flowers

large clusters  
of small flowers

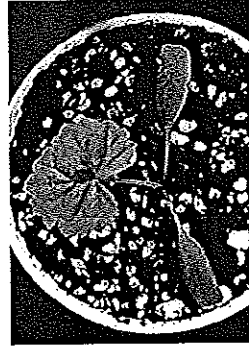
## Growth Stages



Dead Stems

After producing seeds in late summer, the plants die, leaving stems standing into winter. At this point seeds have been dispersed to germinate the following spring or in future years.

(Photo credit: Cornell Cooperative Extension, Misc. Bull. 123)



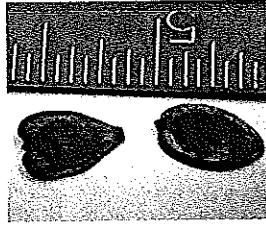
Seedling

Seeds germinate from early spring throughout the growing season.



Rosette of leaves

...Leaf clusters sprout from overwintering roots each year for 2-4 years until the plant flowers.



Cow  
Parsnip

Giant  
Hogweed

Seeds

Produces seeds in late summer (Photo credit: Connecticut Invasive Plant Working Group)



Flowering Stems

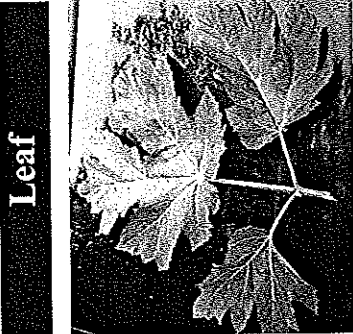
Plants bolt and flower in early to mid-summer after rosette plants accumulate enough energy reserves.

## Similar Plants Commonly Mistaken for Giant Hogweed

**Cow Parsnip** (*Heracleum lanatum*), a native plant, is most likely to be confused with Giant Hogweed. Cow Parsnip is smaller, reaching a height of 5-8' in Pennsylvania. Unlike Giant Hogweed, the stem may be entirely green or have a slight purplish cast, is deeply ridged and only up to 1-2" in diameter. Hairs on Cow Parsnip are fine, soft and fuzzy, rather than coarse like those on Giant Hogweed. Although present on both leaf surfaces, the soft hairs occur primarily on the lower surface and give the leaves a velvety appearance. Mature leaves measure up to 2 to 2 ½' in diameter. Cow Parsnip generally flowers from early June through early July, typically several weeks before Giant Hogweed, and produces much smaller, flat topped flower clusters.



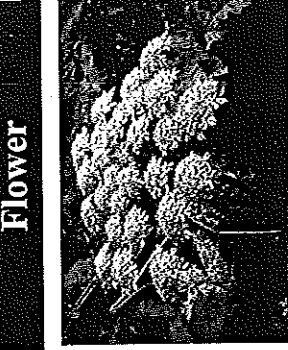
Plant



Leaf

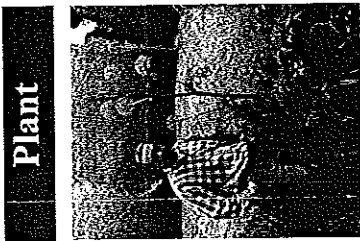


Stem



Flower

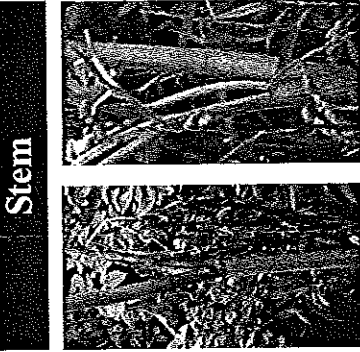
**Angelica** (*Angelica atropurpurea*) is easily distinguished from Giant Hogweed by its uniformly waxy green to purple, smooth hollow stems and compound, globular, softball-sized clusters of white or greenish-white flowers less than 1' in diameter. Angelica is shorter than Giant Hogweed, seldom attaining a height of 8'. The mature compound leaves can reach widths of 2' and have dozens of small leaflets. This plant typically flowers from mid May through mid June.



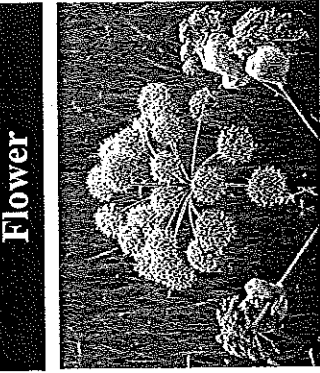
Plant



Leaf

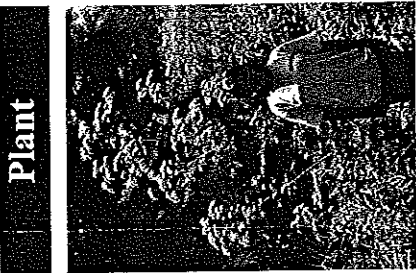


Stem

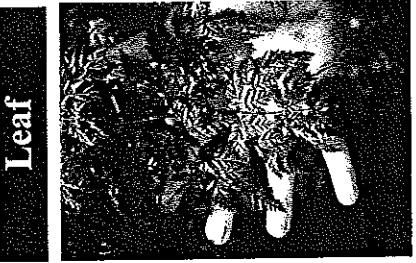


Flower

**Poison Hemlock** (*Conium maculatum*) is a multi-branched, non-native biennial ranging from 4 to 9' tall. The waxy stem has purple blotches, and the entire plant is smooth. Leaves are bright green, fern-like and may appear glossy. Small white flowers are arranged in numerous, small, flat-topped clusters on all the branches. Poison Hemlock has a disagreeable "mousy" odor, and the entire plant is poisonous if ingested. It generally flowers in late May through late June.



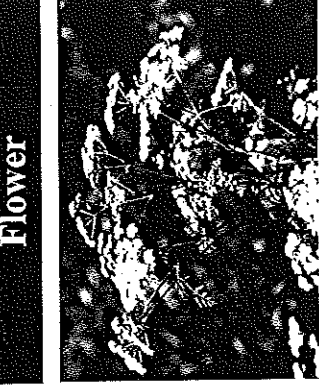
Plant



Leaf



Stem



Flower

# Norway Maple

## *Acer platanoides*

Maple Family (Aceraceae)

**Description:** Norway maple, a deciduous tree, reaches a height of 40-50 feet, occasionally exceeding 90 feet. The leaves are dark green, simple, opposite, 4"-7" wide with 5 lobes. The mature tree has a rounded crown of dense foliage and the bark is grayish-black and furrowed. Norway maple is distinguished from other maples by the milky fluid that oozes from freshly broken leaf petioles (stems). The tree leafs out and produces seeds earlier than other maples. Its normal fall foliage is pale yellow; however, there is a popular cultivar known as "Crimson King" which has deep reddish purple fall foliage.

**Origin:** Norway maples are native to Europe, from Norway southward. Populations in the United States have either escaped from cultivation or originated from individual trees used as ornamental specimens.

**Habitat:** Norway maple is well adapted to various soil extremes, such as sand, clay or acid. It grows in hot and dry conditions, and it can tolerate ozone and sulfur dioxide air pollution. Norway maples are widely planted in the United States and can be found from the northern border with Canada south to the Carolinas (Hardiness Zones 3-7).

**Why is it a problem?** Individual trees produce large numbers of seeds that are wind dispersed and invade forests and forest edges. The dense canopy formed by Norway maple inhibits the regeneration of sugar maple and

other tree seedlings, reducing forest diversity. Also, since Norway maple has shallow roots, it competes with other plants in the landscape, including grasses, and can cause damage to pavement in urban settings.

**Management:** Norway maple can be controlled by hand removal of seedlings. Larger trees in the natural landscape can be girdled.

### Alternatives:

*Acer rubrum* (Red Maple) has red fall color and is a good wildlife food source.

*Acer saccharinum* (Silver Maple) is a good wildlife food source, but may be too large for use as a street tree.

*Acer saccharum* (Sugar Maple) is a good wildlife food source, but is susceptible to road salt damage.

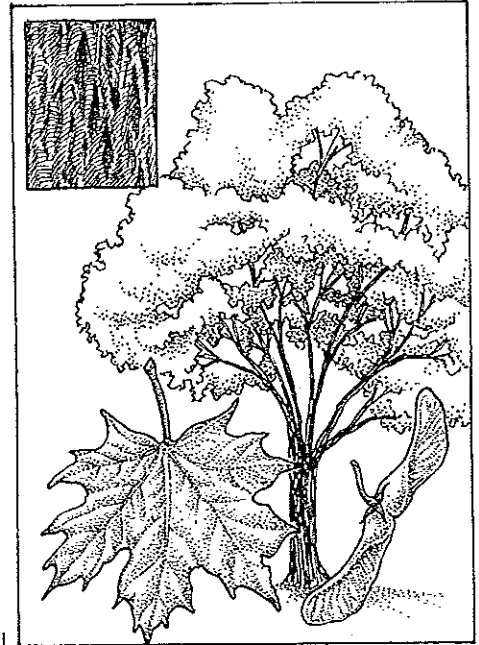


Illustration by E. Farnsworth

*Quercus spp.* (Oaks) are an excellent wildlife food source.

*Tilia americana* (Basswood) is a good shade tree.

### Written by:

Tim Abbey  
CT Agricultural Experiment Station  
May 2000

### References:

Dreyer, G. Trees and Shrubs for Your Community. Northeast Utilities.

Dirr, M. 1998. Manual of Woody Landscape Plants, 5<sup>th</sup> ed. (Champaign, IL: Stipes Publishing Co.)

Gleason, H. A. and A. Cronquist. 1991. Manual of Vascular Plants of Northeastern United States and Adjacent Canada. 2<sup>nd</sup> ed. (Bronx, NY: The New York Botanical Garden) 910 pp.

This fact sheet was produced by the Connecticut Invasive Plant Working Group. For more information, visit our website at: [www.hort.uconn.edu/cipwg](http://www.hort.uconn.edu/cipwg). Printing has been funded in part by the USDA Animal and Plant Health Inspection Service.



**Plants Recommended for Wildlife**  
**By Peter Picone, Wildlife Biologist**  
**Connecticut Department of Environmental Protection**

Northern Arrowwood Viburnum (*Viburnum recognitum*)  
Beebalm (*Monarda didyma*)  
Cardinal Flower (*Lobelia cardinalis*)  
Highbush Blueberry (*Vaccinium corymbosum*)  
American Cranberrybush (*Viburnum trilobum*)  
Northern Bayberry (*Myrica pensylvanica*)  
Red Maple (*Acer rubrum*)  
Red Mulberry (*Morus rubra*)  
Summersweet, Sweet Pepperbush (*Clethra alnifolia*)  
White Oak (*Quercus alba*)  
Winterberry (*Ilex verticillata*)

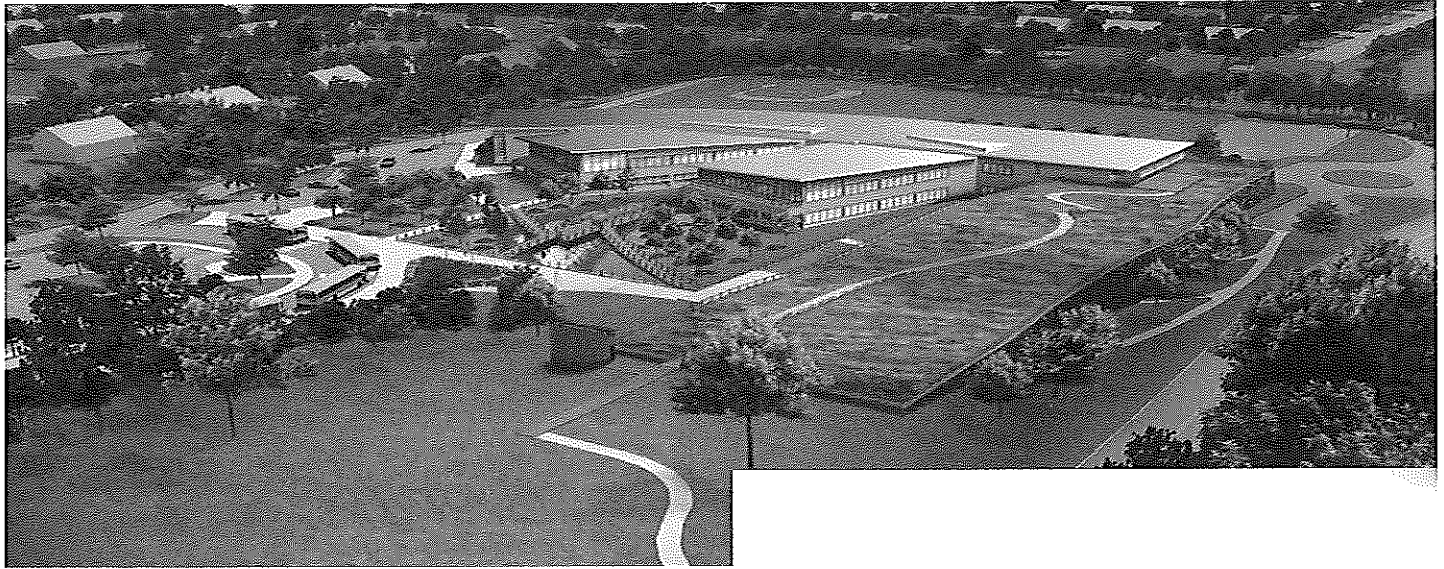
**In addition, the following plants are recommended for the homeowner to plant rather than using invasive plants. Many of these also provide food for wildlife.**

Chokeberry (*Aronia arbutifolia*)  
Fothergilla (*Fothergilla gardenii*, *Fothergilla major*)  
Inkberry (*Ilex glabra*) (compact forms)  
Virginia Sweetspire (*Itea virginica*)  
Swamp Milkweed (*Asclepias incarnata*)  
Blue Giant Hyssop (*Agastache foeniculum*)  
Joe Pye Weed (*Eupatorium dubium*, *E. purpureum*)  
Purple Coneflower (*Echinacea purpurea*)  
Sugar Maple (*Acer saccharum*)  
Buttonbush (*Cephalanthus occidentalis*)  
Drooping Leucothoe (*Leucothoe fontanesiana*)  
Mountain Laurel (*Kalmia latifolia*)  
Red Twig Dogwood (*Cornus sericea*)  
Rhododendron (*Rhododendron carolinianum*, *R. catawbiense*)  
Shadbush (*Amelanchier arborea*)  
Spicebush (*Lindera benzoin*)  
Witch Hazel (*Hamamelis vernalis*)

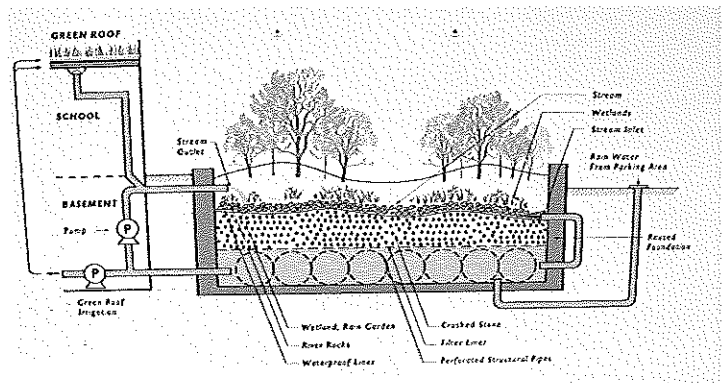


# AGRESOURCE HIGHLIGHTS

## Stamford Inter-District Environmental Magnet School



A lightweight soil was made to strict specification requirements for installation on the rooftop and rain garden of the new Inter-District Environmental Magnet School located in Stamford, CT. Agresource manufactured the mix and utilized AGRESOIL COMPOST made in Fairfield, CT as a key component. The compost supplied the organic matter, nutrients, and microbial life to support thriving plant material on the roof and in the rain garden.



Tai Soo Kim Partners contracted CR3 Landscape Architects from Simsbury CT. to design this system that would maintain all the stormwater onsite.

**AGRESOURCE INC. - QUALITY COMPOST, SOIL & MULCH**  
**800-313-3320 - WWW.AGRESOURCEINC.COM**

## AGRESOURCE HIGHLIGHTS

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### *Lightweight Soil for Rooftop Garden in New York City*



A rooftop garden was installed on a residential cooperative in the heart of Manhattan in the spring of 2008. Weston Solutions and Sunny Border Nursery in coordination with the building owner designed the landscape which utilized the GreenGrid® rooftop system. The residents of the property are embracing New York City's goal to dramatically increase the number of green roofs within its boundaries, reducing stormwater runoff and the urban heat island effect while creating habitat and green space. Agresource, Inc. made the custom blended lightweight soil that was meticulously designed for the project.

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## **APPROVAL OF MINUTES**

**April 6, 2010**

Inland Wetlands and Watercourses Meeting  
**INLAND WETLANDS AND WATERCOURSES AGENCY**  
**MINUTES OF A REGULAR MEETING**  
**TUESDAY, April 6, 2010**

A Regular Meeting of the Enfield Inland Wetlands and Watercourses Agency was held on Tuesday, April 6, 2010 in the Council Chambers, Enfield Town Hall, 820 Enfield Street, Enfield, Connecticut.

MEMBERS PRESENT: Douglas Maxellon, Chairman  
Karen Camidge  
Maryann Abar, Alternate (7:52 p.m.)  
Joseph Albert  
Robert Lemay  
Brian Peruta  
Robie Staples  
Patrick Szczesiul, Alternate (seated)

MEMBERS ABSENT: Jo-Marie Nelson

ALSO PRESENT: Katie Bednaz, Wetlands Agent  
Susan Berube, Recording Secretary

**REGULAR MEETING**

1. Call to Order: The meeting was called to order by Chairman Douglas Maxellon at 7:00 p.m.

2. Roll Call: Present were: Chairman Maxellon and Agents Abar (7:52 p.m.), Albert, Camidge, Lemay, Peruta, Staples, and Szczesiul. Also present were Katie Bednaz, Wetlands Agent and Susan Berube, Recording Secretary.

Agent Szczesiul was seated as a full voting member for the public hearing.

3. Pledge of Allegiance: The Pledge of Allegiance was recited.

4. Executive Session  
(Matters regarding specific employees, pending litigation, acquisition of real estate and / or matters exempt from disclosure requirements): None.

**5. Public Hearing**

a. **XIW-10-04 - Town of Enfield Public Works** - is requesting a permit to reconstruct and enlarge the South Maple Street Bridge over the Scantic River (Map 84, Lots 7, 12, 14 and 21). Submitted March 3, 2010, received 3/16/10, PPE 3/30/10, **MAD 5/20/10**. Piya Hawkes, Enfield Public Works Director and Jeff Scala, project engineer from Tectonic Engineering, represented the applicant.

Mr. Hawkes stated that he received and addressed all of Ms. Bednaz's comments.

Mr. Scala briefly reviewed the proposed project. He stated that the existing bridge was built in 1929 and rehabbed a few times over the years.

The plans show that the existing bridge is 62' long and will be lengthened to 82' to meet FEMA regulations for 100 and 500 year floods and the Army Corps of Engineers regulations for light, air and riparian corridor requirements.

The existing abutments will be removed and replaced with new ones.

Temporary coffer dams will be installed to allow for construction of the new bridge. The dams will meet regulations for 2 year storms. Temporary sediment structures will be created on each side of the structures.

A parking lot will be constructed on the D.E.P. property along the western flank of the work site.

The D.O.T. is currently reviewing the flood management permit application.

The application for the Army Corps of Engineers permit will be submitted after IWWA approval is received. The applicant does not anticipate a problem in obtaining the Army Corps' permit.

All hydrology and hydraulic reviews have been completed.

A new drainage outfall with a pre-formed scour hole will be installed at the northeast corner of the parcel on town owned property to replace an existing outfall located on private property.

Erosion and sediment controls will follow Best Management Practices and the current CT Storm water Manual.

Slopes will be stabilized as soon as possible using mulch and seed.

Federal and state funds will be used for this project and will therefore require full time inspection and monitoring on site.

4' deep sumps on all structures will be used.

Mr. Scala provided, at this time, copies of the certified mail receipts to abutters to Ms. Bednaz.

He also submitted the following, for the record:

- drainage report, flood management certificate in draft form,
- D.E.P. endangered species map, aerial photo overlaid to the project to show the limits for clearing of trees for the parking lot,
- limits of the regulated area including the upland review area which is 200' along the Scantic,
- photos of the project site,
- the written response to Ms. Bednaz's comments,
- review letter from the D.E.P Fisheries Division,

- Erosion and Sediment details and
- the Soil Scientist's Report

At Ms. Bednaz's suggestion, Mr. Scala briefly reviewed the applicant's responses to her written comments.

1. The application number will be on the final set of plans.
2. a. Mr. Hawkes stated that "right of entry forms" are sent to abutting property owners that are to be returned to the Enfield D.P.W. Ms. Bednaz requested a copy for the IWWA file.
  - b. Notification has been provided.
  - c. The soil scientist's report is based on information from 4 years ago. The applicant believes it accurately reflects the location of the wetlands.
3. Ms. Bednaz expressed concern that the limits of clearing may not be enough room for the work that needs to be done at the catch basin outfalls. She wants to ensure that there is no new scour from the new catch basins.

Mr. Scala stated that the work is usually done from above. The applicant will use pre-formed scour holes to mimic the existing grade. He will add contours to the plan.

4. Mr. Scala stated that if the IWWA requests, the final submittal of plans will include the upland review area line.
5. Mr. Scala noted that the applicant has supplied an aerial photo overlaid on the proposed parking lot area to show the limits of clearing.
6. The applicant will follow the Army Corps of Engineers requirements for wildlife habitat accommodation.
7. In regards to the rip rap, it is for protection of the bridge and footings. The existing material will be removed and stockpiled.

Rip rap will be installed and then the natural materials re-installed although it may not remain there during large storms. Small excavation equipment will be used.

Ms. Bednaz asked where the stockpile will be kept and where the staging area will be set up.

Mr. Scala stated that the applicant is trying to give the contractor as much leeway as possible. It will be up to the contractor who will no doubt have experience in this type of decision. The applicant prefers to tell the contractor what cannot be done, and let the contractor make suggestions.

The banks in this area are very steep. The river would stay within the banks in a 500 year event. Materials cannot be stored within the 500 year flood plain.

The applicant feels that the D.O.T. requirements are adequate for spillage issues. A concrete washout area will not be allowed within the flood plain.

The 500 year flood limit is approximately 1' higher than the 100 year limit.

8. This item has been addressed.

9. Standard details have been provided.

Ms. Bednaz requested that 1 full size, complete final set of plans be submitted for the file after all comments and changes are made.

She also noted the importance of having the dewatering basins sized correctly.

She asked that the overflow from the basins be directed to the catch basins that are already armored systems so that there are no erosion problems.

Mr. Scala stated that the plans shown are conceptual for pumping operations. The contractor will need to decide what size is needed.

Mr. Hawkes explained that the applicant is trying to let the contractor decide what to do. He doesn't want to slow the contractor down by determining the means and methods to use.

Mr. Scala added that the applicant doesn't want to oversize and over-design the project. He understands staff's concerns. He noted that it can be designed by the applicant and still go wrong, and it can bring the cost way up.

Ms. Bednaz suggested not allowing any overflow to be overland so that no new scouring takes place.

Chairman Maxellon stated that outside perimeters at the least are needed; this is a sensitive area.

Mr. Scala stated that he would draft some sort of specs for staff and the IWWA's review.

Agent Camidge asked what the correct application number is.

Ms. Bednaz stated that it changed from 10-02 to 10-04.

Ms. Bednaz, noting that it is a very tight area, asked who drafts guidelines for the storage areas.

Mr. Scala stated that the D.E.P. has asked that access be maintained to the park. The road is to be closed at Powder Hill Road for most of the construction. That area can be used for storage except for pedestrian traffic. He feels that this will be sufficient for storage.

Ms. Bednaz felt it would be reasonable to add some specs into the conditions of approval regarding the location of the storage yard, etc.

Agent Camidge asked if the existing outlet that is to be replaced, will be removed.

Mr. Scala responded that it outlets to the west. Most of it will be removed and the end will be plugged.

Agent Camidge, in reference to the project photos submitted, asked if anything will

be done about the erosion along the banks.

Mr. Scala replied that nothing will be done because, unfortunately, it is located beyond the project limits.

Agent Camidge stated that she expects that there will be issues there in the future. She asked when the project will start.

Mr. Scala responded that it will start later this year with possible plantings next spring.

Agent Albert noted that the project is to have D.O.T. and D.E.P. inspectors on site. Federal, state and local regulations will be followed by the contractor.

Mr. Scala stated that the contractor will need to abide by the most stringent conditions within the contract. If the IWWA conditions are more restrictive than the federal conditions, the contractor will follow those of the IWWA.

He added that he will provide the Army Corps of Engineers' and the D.E.P.'s and D.O.T.'s comments to staff for distribution to members.

Agent Peruta asked who will be inspecting the site.

Mr. Hawkes replied that 5 consultants have been interviewed and were pre-approved by the D.E.P. A contractor has been selected and submitted to the D.E.P.

Mr. Scala explained that there will be 1 full time inspector – a "chief" inspector" who would be a licensed engineer or NISN Certified. It would be someone who is experienced in bridge and highway construction and understand specs and plans.

Agent Peruta expressed his concern over potential damage to the area. The Agency wants to protect the river and wildlife.

He asked if the consultant has a background in D.E.P.

Mr. Hawkes replied that the Town has hired GN Square. The company is a structural engineering firm and has other staff that they can call in.

Agent Staples noted that this is not Mr. Scala's first bridge project and there will also be D.E.P. and D.O.T. inspectors on site.

Mr. Scala added that if this were a million dollar project, there would be a full time environmental specialist on site. This is a comparatively small project.

Mr. Hawkes noted that the South Road project, which is over 1 mile long, will also have only 1 inspector. The Federal Government funding limits how many people can be on site.

Mr. Scala stated that he understands the IWWA's concerns. He worked for the D.O.T. for 13 years and has over 20 years experience in this type of work.

Chairman Maxellon reiterated that this is an extremely sensitive area. He has worked with D.O.T. inspectors also. He feels that the contractors need some guidelines. He is not concerned over the structural engineering portion. His concern is over the environment and wetlands.

He added that he understands the desire to shift responsibility to the contractor but he feels that they need some parameters.

He is concerned over the overflow to the river from the temporary dams.

He also expressed concern over the current erosion crossing the road and entering the river. He asked if anything can be done about this.

Mr. Scala stated that because it is out of the project limits, nothing can be done.

Chairman Maxellon noted that the Town will no longer have a wetlands agent to make inspections, after July 1. He would like to see GN Square provide someone with Inland Wetlands experience.

Mr. Hawkes stated that the contract will be awarded in May, 2010. Work will begin in June and work will be in the water in July.

Chairman Maxellon requested that any additional information be given to staff as soon as possible so that it can be included in members' packets for the next IWWA meeting.

At this time, Chairman Maxellon opened the hearing for public comment.

Mr. Ralph Sweet, owner of the Powder Mill Barn, 32 South Maple Street, Enfield stated that all of his concerns have been answered. He is in support of the project.

He noted that his property is downstream of the bridge. The river is eating the bank – removing 25 to 30' from what the maps of 1880 showed and 4 to 5' since he's been there.

No one else in the audience came forward to speak for or against this application.

Chairman Maxellon closed the public hearing portion of the meeting at 8:15 p.m.

6. Call to Order of Regular Meeting: The regular meeting was called to order by Chairman Maxellon at 8:15 p.m.

Present were: Chairman Maxellon and Agents Abar, Albert, Camidge, Lemay, Peruta, Staples, and Szczesiul.

Also present were Katie Bednaz, Wetlands Agent and Susan Berube, Recording Secretary.

Agent Szczesiul was seated as a full voting member for the regular meeting.

7. Public Participation - Issues of concern not on the agenda: None.

8. Correspondence: Ms. Bednaz briefly reviewed the correspondence from the meeting of March 16, 2010. This included:

- CAWS vernal pool monitoring program
- Army Corps of Engineers Category I Eligibility Determination Form
- Army Corps of Engineers highlights from 02/26/10 presentation
- Farming Exemption Criteria Clarification.

Ms. Bednaz then briefly reviewed the correspondence included in members' packets for this meeting:

- a. Public Works Correspondence Regarding Sharp Street
- b. "Legislature Restores Consideration of Wildlife to Inlands and Watercourses Act" Article
- c. ERT Program Update
- d. "Wetlands In the Courts - Recent Cases" Handout
- e. DEP 2009 Legislation and Regulations Advisory
- f. "Notification of Timber Harvest Form"
- g. "The Habitat" It was noted that this publication has not only articles that are useful, it also has numerous advertisements for products that applicants propose to use in their projects. These advertisements often have websites which provide more information that could prove helpful to members in learning about how these products work.

9. Commissioner's Correspondence: Chairman Maxellon noted that the power line expansion was approved and the lines will not be going through Enfield; they go through Suffield.

He also noted that due to budget cuts, it is anticipated that Ms. Bednaz's position will be eliminated as of June 30, 2010. It is likely that Mr. Giner, Director of Planning will become the IWWA liaison.

- a. Site Visit Updates: Agent Lemay reported that the silt fences had fallen over during the recent heavy rains. They are now re-installed.

10. Approval of Minutes - February 2, 2010: A motion was made by Agent Camidge and seconded by Agent Szczesiul to approve the minutes of the meeting of 02/02/10 with the following amendment: page 5, 4<sup>th</sup> paragraph, second was made by Agent Camidge, not Agent Abar; page 6, 4<sup>th</sup> paragraph, second was made by Agent Camidge, not Agent Abar. Vote was 6-0-1(Lemay)

March 16, 2010: A motion was made by Agent Camidge and seconded by Agent Szczesiul to approve the minutes of the meeting of 03/16/10 as presented. Vote was 7-0-0.

11. Wetlands Agent Report: Ms. Bednaz briefly reviewed her written report.

With regards to the washout long Sought Maple Street, she suggested that perhaps the D.P.W. could make necessary repairs. She will look into this further.

Ms. Bednaz also noted that it has been discovered that Japanese Barberry plants host a large number of ticks, approximately 1/2 of which are found to be infected



with Lyme Disease.

Ms. Bednaz also stated that the Town's Engineering Department is slated to have a major layoff as well. She is unsure how that department will function in relation to the IWWA's needs.

Agent Peruta expressed concern over possible slope failures at Sun and Play Streets.

Chairman Maxellon added that a tree fell down at 42 Play Street.

Ms. Bednaz replied that she is unsure if the D.P.W. has looked at this. She has not had a chance to follow up yet. There was a washout earlier in the spring. It was not 100% stable, but close.

She suggests that something stronger than a silt fence be installed, perhaps triple hay bales. This would be expensive, though.

Agent Peruta stated that he will check the area again.

Chairman Maxellon stated that it would be a shame to let the slopes go back to what they were, after all of the money that was spent to repair them.

## 12. Old Business

a. **IW-534- Enfield Properties** - is requesting a permit to construct two office buildings and five residential apartment buildings 153 South Road and adjacent lots (Map 55, Lots 80, 93 & 99), within the regulated area. Submitted 12/15/09, received 12/15/09, PPE 12/29/09, MPHCD 2/23/10, **EMPHCD 3/16/10**: Agent Staples recused himself from discussion on this application and left the meeting for the evening (8:50 p.m.).

Ms. Bednaz noted that a request for an extension to 04/06/10 should have been given to the IWWA at the meeting of 03/16/10. She requested that the applicant provide one soon.

Ms. Bednaz noted that she created a memo for the file to show that all outstanding IWWA concerns on this application have been addressed.

She also drafted a memo to the PZC regarding rotational mowing, as previously requested by the IWWA.

Agent Peruta, in reference to proposed condition #21, suggested that the inspector should be certified in some way.

Agency members discussed the need for the inspector to report his/her findings regularly to the IWWA. It was suggested that the inspector's report could be emailed to Agency members.

Discussion also took place as to the cost of the inspector and who is responsible for hiring and paying for the inspector.

Agent Albert wondered if the Town would be hiring a consultant to take Ms. Bednaz's place on things such as inspections.

Ms. Bednaz stated that the IWWA regulations state that the applicant must pay for an independent inspector, approved by the IWWA.

Agency members discussed the possibility of changing the condition of approval at a later date if the Town has a consultant and the applicant no longer needs to provide an independent inspector.

Ms. Bednaz noted that this would require a modification of permit, at a cost for the applicant. The process would have to be started by either the applicant or IWWA as it would not be automatic.

After further, brief discussion, this option was found to be agreeable to both the applicant and Agency members.

Condition of approval #21 was changed to reflect her 1<sup>st</sup> draft with inspections to take place every other week.

A motion was made by Agent Peruta and seconded by Agent Lemay to approve IW 534 with the standard conditions numbered one through seventeen, as well as the following conditions numbered 18 through 26, with condition #21 revised as discussed:

18. The yard drain proposed to be located on Ronal & Rebecca Calabrese's property, Map 55, Lot 94 may only be installed within the existing lawn area and not within the tree line. It is also recommended that a drainage easement be provided for this structure so that it may be properly maintained.
19. Stated on sheet LS-1 of the project plans "... 6 foot high, white panel fence may be installed along property line as determined in field with abutting property owners and Project Landscape Architect. Final location to be determined in field and adjusted to preserve existing trees." The specifications of the fence shall first be submitted to the IWWA or their designated Agent for review and approval prior to installation. Currently, a portion of the fence is shown to be located within wetlands. The installation of the fence shall accommodate for wildlife migration and minimize impacts to wetlands. Erosion controls shall be installed to prohibit any disturbed soil from migrating into the resource areas.
20. A performance surety bond in the appropriate form shall be posted for 125% of the cost estimated by the applicant and confirmed by the IWWA Agent for the wetland mitigation activities (creation, enhancement, replacement) as proposed in the approved plans. The bond may be released by the IWWA Agent after the report is received following the third complete growing season for each mitigation area, as approved and completed to the Agent's satisfaction. The bond may be held for a longer period of time until it is determined that the mitigation areas are performing as designed. Release of the bond by any other agency, board or commission does not remove the permittee's obligations with regard to this permit condition.
21. In accordance with Section 18.2 of the Inland Wetlands and Watercourses Regulations most recently revised in February 2005 an independent inspector who is a Certified Professional in Erosion and Sedimentation Control (CPESC)

or equivalent shall be hired by the Town of Enfield at a reasonable cost and paid for by the applicant to conduct inspections every other week for the Town of all erosion and sediment control measures and report their findings to the IWWA every other week. Inspections shall be conducted every other week during active construction and every three weeks when construction is inactive and soils remain exposed. Inspections shall be completed after each rain event of greater than 0.5" as determined by NOAA nearest rainfall gauge. The content and presentation of the weekly reports shall be reviewed and approved by the IWWA Agent prior to the start of any construction activities. The independent inspector shall be contracted with prior to the start of work. Payment for approximate three months of inspection shall be forwarded to the Town by the applicant for future payment of services prior to the start of construction. Funds shall be replenished prior to the balance dropping below the estimated cost for one inspection.

22. A wetland scientist, hired by the applicant, shall be on-site daily during the construction of the wetland mitigation areas. A weekly report that details progress, issues, solutions and determinations shall be submitted to the IWWA for tracking of the mitigation area construction progress.
  23. A Conservation Restriction in favor of Enfield Properties, as shown on the approved plans shall be placed on the applicable properties prior to the issuance of the Certificate of Occupancies for each subject property. A copy of the draft or final deed for each parcel must be submitted to the Inland Wetlands and Watercourse Agent for review and approval. Conservation restriction markers shall be installed in accordance with Town requirements, by a licensed surveyor, at the applicant's expense. Easement markers will be provided by the Planning Department. Where no trees are present greater than 6" dbh, easement markers shall be placed on 4" x 4" wooden posts to demarcate the easement boundary. Markers shall be placed at a minimum of 40 feet apart.
  24. All wetland creation, restoration and enhancement activities shall be completed as part of Phase 1 of the project unless otherwise approved in writing by the IWWA or their designated Agent.
  25. Mitigation for the projects impacts will be completed in accordance with the plans detailed in item 15 of this approval as well as specified in Rema Ecological Services, LLC February 16, 2010 Wetlands Assessment Report and Rema Ecological Services, LLC March 16, 2010 Mitigation Monitoring, Post-Construction Vegetation Management, and Release of Biological Control for Purple Loosestrife" letter report, both included in the project file.
  26. Mitigation has been proposed that includes rotational mowing of the open field area to the south of the commercial development so that it is maintained. The schedule for this mowing is included in REMA Ecological Services, LLC March 16, 2010 letter report regarding "Mitigation Monitoring, Post-Construction Vegetation Management and Release of Biological Control for Purple Loosestrife". This mitigation is designed to continue for the life of the development, which in most cases will continue beyond the validity of this approval. Therefore, it is recommended that this mitigation also be included on the site plan approval by the Enfield Planning and Zoning Commission (PZC). A memo requesting such has been submitted to the PZC from the IWWA.
- Vote was 6-0-0. Reason for approval was that the project will not have an adverse impact on inland wetlands and watercourses.

13. New Business: None.
14. New Applications to be Received
- a. Applications to be received after Town deadline for Agenda: None.
15. Other Business
- a. IWWA Fines Ordinance
- b. IWWA Fee Schedule
- c. IWWA Regulation Revisions: It was the consensus of the Agency members to schedule special meetings on April 15 and April 29, 2010 at 7:00 p.m. to discuss the IWWA fee schedule and IWWA regulation revisions.

A motion was made by Agent Camidge and seconded by Agent Szczesiul to table discussion on agenda item 15a. to the IWWA regular meeting of April 20, 2010 and agenda items 15b & c to the IWWA special meetings of April 15 and 29, 2010. Vote was 6-0-0.

It was the consensus of the Agency members to approve the memo drafted by Ms. Bednaz dated 04/06/10 and addressed to the PZC regarding IW#534.

d. Next regular meeting is Tuesday, April 20, 2010 at 7:00PM in the Council Chambers.

16. Adjourn: A motion was made by Agent Camidge and seconded by Agent Albert to adjourn the meeting at 9:15 p.m. Vote was 6-0-0.

Respectfully Submitted,

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Jo-Marie Nelson, Secretary